THE MICRO USER

Volume 9 Number 12 February 1992 £1.95

140 PAGES PACKED WITH VITAL INFO

Play it again Sam

NOTATE
Music writing made easy

LASER PRINTERS
Comparing light with light

GOT IT WRONG?
Beat the program bugs

LOTTERY
Ticket numbering computerised

THE COMPLETE SOLUTION FOR ALL ACORN USERS

BBC Micro, Master, A3000 and Archimedes series

INNOVATIVE EDUCATIONAL SOFTWARE FOR THE 1990s

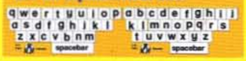
spell it
ra
rabbi

colin wins!
snail
2 peter
3 colin
2 louise

Confusion eliminated!

Children learn lower case before capital letters. To ensure that they are not confused by the capitals on a keyboard, picture book is supplied with two FREE keyboard overlays.

They both convert your keyboard to lower case – you choose whether to retain the usual qwerty arrangement or use an alphabetical one.



picture book

*"**picture book**" is a fabulous and friendly welcome to computers. It is the ideal first software package for any child taking them from touching their first key to see what happens right through to elementary spelling and counting.*

This suite of four colourful programs all use superb pictures and great sounds to keep children happy for hours as they learn.

alphabet book: An animated electronic version of a child's first abc book. Children love exploring the keyboard, seeing the pictures and learning the words.

spell it: This enjoyable introduction to spelling has two levels. Beginners can first learn how to spell the words then move to the more challenging test level.

count 'em: Using a variety of different pictures children have great fun learning to count. With three levels children will soon master the numbers up to nine.

snap: An entertaining educational version of the popular game. It's for up to three players and has three levels: match pictures to pictures, words or letters.

"I loved Picture Book."
– Computer Shopper

"Educationally sound and user friendly."
– Amiga Shopper

"Make sure they get this."
– Early Times

Recommended for ages: 2 to 5

Money Matters

Money Matters has been carefully designed by teachers to help children to progress from their first encounter with coins right through the early stages of the National Curriculum.

Children using Money Matters will learn how to recognise coins, how to use them in simple contexts, how they can solve problems involving different sums of money and more – especially AT2 (number) levels 2. and 3.

Cozmo's Coins: Here's a clown who knows the name of every British coin from 1p to £2. He wants to to make sure that all children do too. Cozmo really makes discovering currency fun.

Boingy: Adding coins together is Boingy's speciality. He asks children to try to find the single coin that is the same value as the ones he shows. He gives them lots of help if it's needed.

Piggy Bank: Toothy thinks of a number of pence and knows exactly which coins add up to it. Children have to work out what he's thinking of and press the coins on the keyboard.

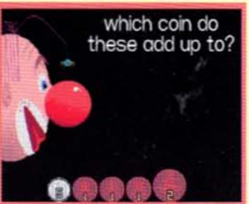
Fizzy Pop: Knowing how to calculate the correct change is important when you're shopping. Fizzy sells sweets – children have to help him give the correct coins as change.

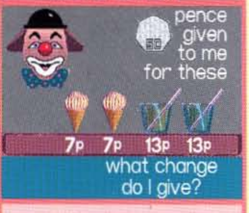
"Exceptional value for money."
– Micro Computer Mart

"Colourful and imaginative software."
– Computer Shopper

"It is fun and very educational."
– STUNN!

Recommended for ages: 2 to 11





The keyboard overlay

Money Matters comes with an easily fitted keyboard overlay to help children build up their coin recognition skills. They can now answer questions by pressing the appropriate coin rather than be limited by the design of a normal keyboard. The overlay can easily be removed when it's not needed.

Money Matters
0 1 2 3 4 5 6 7 8 9
yes no
+ - X ÷ =
select

Target Maths

Status = expert
28 30 8
25 54
49 48 36 40
64 42 45
Bonus = 31
Okay = 9
4 x 9 = 36
Finish on 30
Accepted

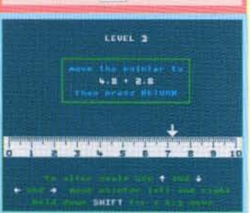
Target Maths is a suite of four cleverly designed educational programs that are such fun to play they make children want to come back for more. Aimed at children and National Curriculum targets, they are fun for everyone – even adults. The targets specifically covered are listed in the programs.

ELIMINATOR: Probably the most challenging way to practise tables ever – *AT2 Level 3 and AT3, Level 4*

NUMBER FACTS: Explore numbers and discover their properties, then play the game – *AT3, Level 5*

SCALE FACTOR: Learn to read rulers and other scales with confidence – *AT2, Level 4*

SLIDER: A computer version of Snakes and Ladders, with a difference – *AT2, Level 6 and AT3, Level 6*



"A solid workhorse with some flair, originality and a straightforward objective." ***– The Micro User***

"You will discover that Maths can be FUN!" ***– STUNN!***

Recommended for ages: 6 to 13

DataWord

Recommended for ages: 7 to 99

DataWord is ideally suited to many tasks in the National Curriculum that demand the use of a Database. And that's not all! Dataword is also a simple-to-use word processor and it has a powerful record linking system that giving many more uses too: It's a really flexible cross-curricular piece of software.

- ✓ An ideal introduction to the world of technology.
- ✓ Designed with ease of use as a priority.
- ✓ Fulfils many of the needs for a database in the National Curriculum.
- ✓ Works just like a card index.
- ✓ DataWord can be used as a word processor too!
- ✓ The built-in card linking system converts DataWord into an electronic programmed learning book, quiz game or a multiple-choice tester.
- ✓ Comes complete with FIVE fascinating example files.
- ✓ Comes complete with two FREE lower case keyboard overlays – you can have the keys in alphabetical order if you prefer.

"It's a wordprocessor and database but it also has the added advantage of being a multiple choice question tester, quiz game and more." ***– Micro Computer Mart***

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"Triple R Education is a new company masterminded by Peter Davidson, the Design and Project Manager of the award winning Fun School 2 – and it shows." – *Amiga Shopper*

"Where it is needed a keyboard overlay is provided. These are very hardwearing." – *STUNN!*

"This is by far the most fun and educational set of programs I have seen." – *Micro Computer Mart*

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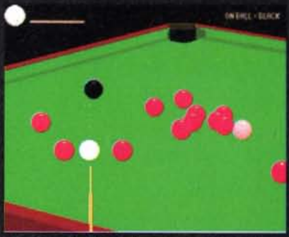

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LIVES

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English word
Phonetic equivalent

ARCticulate £24.95

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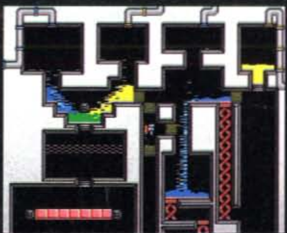
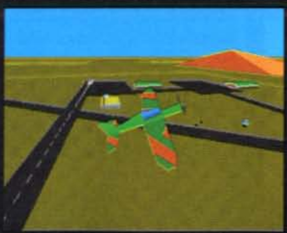


Cataclysm £24.95



Spitfire Fury £29.95 Hopefully Feb '92

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THE MICRO USER

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ABC 23,135
January-June 1991

The Micro User welcomes new program listings and articles for publication. All material should be supplied on disc or tape and printed. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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News Trade Distribution: UMD 071 700 4600

SPECIALS

50 **Laser Printers**
We gave our experts a budget of £1,200. They gave us buying advice and specifications for over 20 laser printers.

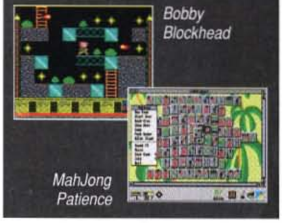
86 **Check Sums** *
Find out how to save your time and sanity by using the Get it right! information to trace typing errors.

93 **Sound Sampler** *
A brand new version of the BBC sound sampler player we published last August – with enhanced features.

113 **DIY Raffle** *
Use your Archimedes and Impression to produce your own lottery tickets.

FREEBIES

We've got some very special offers for you this month with nearly £3,000 worth of products up for grabs. You can find out the details on Pages 17 and 19.



Bobby Blockhead

MahJong Patience

Type-it-in

This symbol * indicates that the feature contains at least one full length listing for you to key in on your micro.

Get it right ✓

All the major listings in this magazine are accompanied by checksums to help you key them in correctly.

For full details of how to use them see the article on page 86 of this issue.

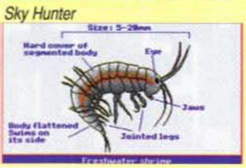
EDUCATION

25 **Update**
The latest details on new products and events in the world of the Acorn machines

27 **Reviews**
Catch our experts' views on the latest products for home and school:

- SkyHunter
- Fun School 3 – Archimedes
- Pond Life

Sky Hunter


Size: 5-20mm
Hard cover of segmented body
Eye
Jaws
Body flattened
Swims on its side
Jointed legs
Freshwater shrimp

Pond Life

JUNE
JULY
AUGUST
SEPTE
NOVEMB
DECEMB
Right!
S N D J A N U A R Y
E D E O C T O B E R
P V C A J J F W Z K
T E E U U U E H K K
E M M G L N B C A M
M B B U Y E R N D J
B E E S V O U J G J
E R R T U G A Q K T
R A P R I L R O T O
H W G T K G Y D P G
START
CLUE
NEW
CANCEL
Dates: Months
fun school 3
DATABASE EDUCATIONAL SOFTWARE

Fun School 3

REGULARS: News 13 ● Mad Hatter 22 ● B

Essential Archimedes

Make your learning curve even easier with our four how-to-do-it series for all Archimedes A3000 users.

54 **DTP**
Manipulate text to make your words shine.

56 **Spreadsheets**
Good presentation can make your figures come alive.

58 **Databases**
Discover the intricacies of relational databases.

60 **Object drawing**
Enhance what you have learnt already using DrawPlus.

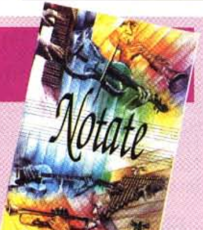
LET'S COMPUTE!

Simple sections that teach you the basics of computer programming

118 **Rom & Ram**
Learn how to move characters around the screen in BBC Basic. *

120 **Safe Scientist**
Spring into action with the Professor. *

NEWCOMERS



64 **Illusionist**
The latest in 3D modelling systems is put through its paces.

90 **Chameleon**
Is this colour utility the answer to the graphic designers' prayers?

101 **Compression Utilities**
The relative merits of Compression and ArcFS discussed in detail.

106 **Notate**
Could this new music package make everyone a composer?

109 **Desktop C**
Acorn's hefty new language development package is explored.

124 **Pipedream 4**
Does this version provide a real advance on its predecessor?

THE MICRO USER

Now! Subscribe for just £20

Yes, you can have a full year's subscription to *The Micro User* for a fraction of the usual cost – check out this exceptional offer on Page 133.

On this month's subscription disc you'll find all the magazine listings relevant to your machine. In addition, those readers with a BBC A3000 or Archimedes series machine will also get:

- Exclusive Bobby Blockhead vs the Dark Planet demo – three unique levels of chaotic colourful and addictive arcade adventure from Atomic Software
- DrawPlus
- Plus the best in PD software

– and you could win one of these!

Take out a subscription to *The Micro User* this month – or renew an existing subscription – and your name will be entered for a fabulous free draw.
The prize: The just-unveiled sensational Iota 3D Image Scanner, or the state-of-the-art BBC A3000. Full details on Page 133

Software SCENE 43

Our experts sift through the latest games releases.

KARMA
SENSORY SYSTEMS CONTROL
SENSOR REPORT WORLD IDENTITY
SENSORS INDICATE THAT THIS IS A GAS PLANET

Karma

Play
Player 2
Type (H/C)
Name
BEEB2
Level (1-
Game Options
Frames (1-9

Q Master

Bobby Blockhead Versus the Dark Planet

Cartoon Line

NEXT MONTH IN THE MICRO USER

We enter our tenth year wth a bumper birthday issue, the best software reviews, an amazing competition plus all our regular articles and the PD Page full of great money-saving ideas.

ly Building 37 ● Problem Solved 83 ● PD Page 117 ● Letters 129

☎

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4 Mation

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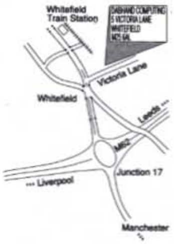

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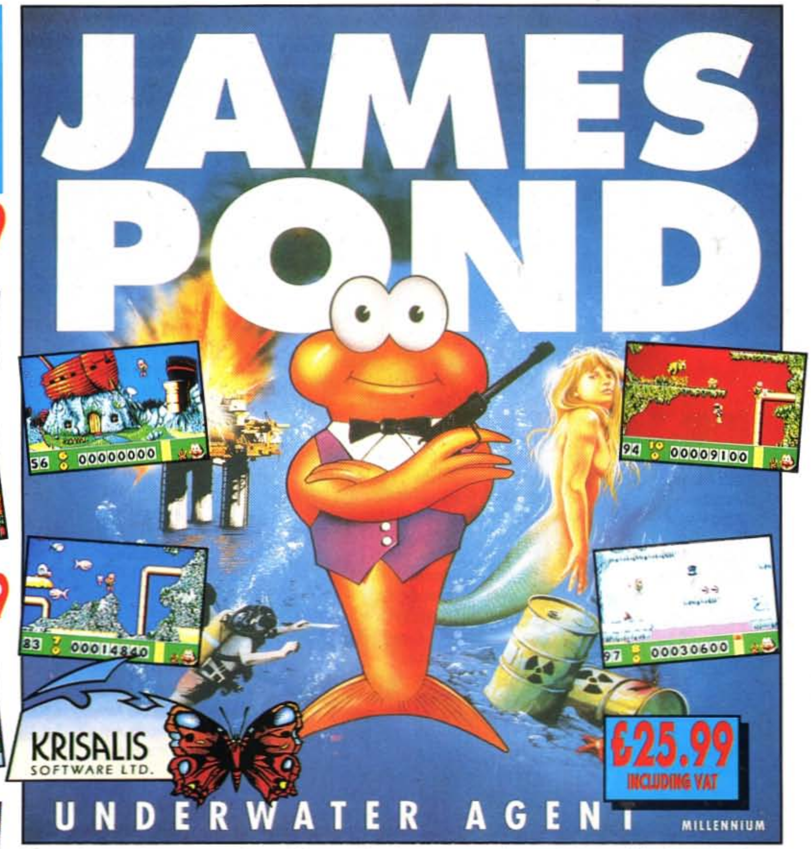

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Sparkle is a RISC OS compliant control package allowing full control of input, output and motor devices via most control boxes. Effectively Sparkle introduces the user to the world of control through a simple language which gives full access to control boxes as well as the ability to carry out data and frequency logging via analogue equipment. Inputs and outputs are simulated on screen and the package includes full counting and timing facilities. Numerous exmples are included as are various exercises. Sparkle can control Deltronics, Phobox and Andi-Oddule control boxes as well as being the LEGO® dacta recommended control software for their Interface A control box. Please state control box when ordering.

Sparkle	£59.00
Sparkle for LEGO®	£59.00
Sparkle Site Licence	£200.00
LEGO® dacta Interface A Control Box	£120.00

Andi - Oddule

The Andi - Oddule is a low cost control box for the A3000 & Archimedes. There are eight input/output connections, four Analogue to digital inputs and one digital to analogue output. The box connects directly to an I²C connector (as found on our analogue & User Port interface) or can connect directly to a standard podule socket via an optional adaptor. The box can be controlled directly via RISC OS SWI calls or by using Sparkle control software (see above).

Andi - Oddule	£49.00
Optional adaptor	£8.00

Analogue & User Port Interface - A3000

Full specification BBC analogue & user port. The analogue port is accessable using ADVAL from BASIC 5 with all BBC OSbyte calls supported.

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*(Adapter needs to be sent to Morley)

A3000 Additional Drives 3.5" and 5.25" kits

Both kits are easy to install and come with full fitting instructions. Basically the kits take the form of one new high quality drive, which you add to with your existing 3.5" drive from the A3000. The 5.25" kit comes complete with power supply and interface. All cables are included

3.5" Kit	£125.00
5.25" Kit	£169.00

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- Four layer printed circuit boards
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2nd Mb - £99 4th Mb - £199
2nd to 4th Mb upgrade - £115

A3000 Memory

- Uses only eight RAM devices
- User upgradeable from 1 to 4 Mb
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- Low power consumption
- Available without RAM devices

Bare card - £35
2nd Mb Card - £56 4th Mb Card - £159

A540 Memory cards

- Uses only eight RAM devices
- Four layer printed circuit board
- Three cards may be fitted giving a total of 16Mb of memory

A540 4Mb upgrade - £275
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ARM3 Upgrades

- 3 to 4 times performance increase
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- Suitable for all ARM2 based machines

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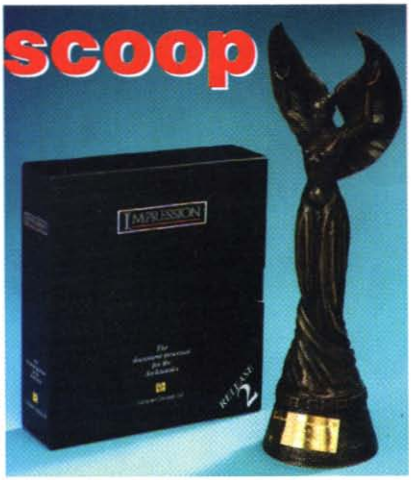
Arc scoop



The Archimedes made its mark in no small way at the recent Computer Shopper Show, with Computer Concepts' Impression II scooping a highly prestigious award against stiff opposition from Apple Macintosh contenders.

Winning the best non-PC business software award, it triumphed over products such as ClarisWorks, WordPerfect and Adobe Illustrator.

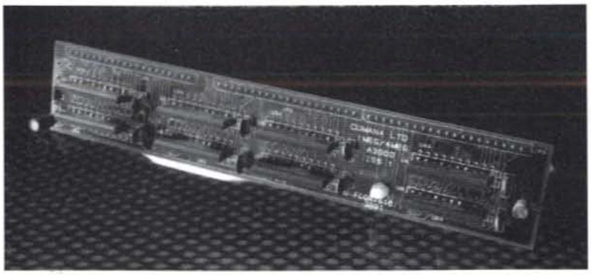
James Lynn – one of the Impression programmers – receiving the award from Jonathan Ross at the Computer Shopper award dinner

A3000 enhancement

ANYONE wanting to increase the memory of their BBC A3000 can be spoilt for choice and Cumana have entered the fray with their new and powerful 4Mb memory upgrade board.

Designed to enhance the A3000 it provides fast access to 4Mb of memory by using 80 nanosecond 1Mb x 4 Dram technology. Low power consumption ensures that there is not undue demand placed on the power supply and the four-layer PCB design helps reduce radio frequency interference noise.

The design eliminates the need to move the keyboard when fitting and its horizontal mounting gives good stability. Slim and easy to fit it costs £155.



Designer T-shirts

HAVE you ever wanted your own design immortalised on your chest? Well now you and your computer can create a design which Awards Plus (0761 437043) will turn into a T-shirt or sweat shirt.

So having created your masterpiece in !Draw or !Paint you need to create a separate postscript file for each colour in your design. You'll find the postscript printer driver on your Applications Discs. Pop these on to a PC disc – using PC Access for instance – and that's all there is to it.

Advances in printer ink technology allow Awards Plus to provide economical one-off printing in black, red, blue, green and yellow. The process will cope with up to A4 designs and one-off prices start at £8.95.

Technical communications

WITH appeal to technical authors and anyone involved with technical communication is TECDOC '92. Arranged by the Institution of Electronics and Electrical Incorporated (071-836 3357) it is the ninth in a series of two-day residential conferences.

With more and more emphasis being placed on accurate technical documentation in specifications, instruction manuals and technical sales brochures, there are speakers from industry – OMI Logistics, Sony Broadcast and Unisys – and Oklahoma University.

All areas of technical communication will be covered. TECDOC '92 will be held in Bournemouth in April.

Giving the fax

AN essential piece of hardware these days is the fax machine. As more and more business and communication is made via this method, it was only a matter of time before the Archimedes market followed the trend of other computers to incorporate an integral fax.

Computer Concepts (0442 63933) – despite some delay – are now ready to ship their fax card, Fax-Pack. Priced at £299 it takes the form of an expansion board compatible with the entire Archimedes range, although the A3000 model will have to be fitted externally.

Rather than putting your fax on paper and then putting this manually through a standalone fax machine, you can send it directly from an application avoiding unnecessary and wasteful print, paper, time and money.

Fax-Pack uses the basic printing system used with the LaserDirect, with Risc OS applications treating the Fax-Pack as they would a 200dpi printer. But rather than printing on a direct drive laser, the output is sent down the telephone line to a fax machine anywhere in the world. Apart from the fact that you don't have to get up from your computer to send a fax, there are other advantages.

Speed is one and another is that once the page is printed it is queued in memory and control is returned to you while the Fax-Pack sends your fax in the background. Incoming faxes are also received into your machine while you work and without interruption.

These communications are stored on disc and can be printed or viewed in the FaxView utility. This shows a reduced, anti-aliased view of the page so you can see it all at once. Using the same program you can select a part of it, save it as a sprite, or scale it to any magnification as well as step forward and backward through multi-page faxes.

If you are sending a fax to someone who also has a Fax-Pack, just drop your file on to the icon. As all data is error corrected this method is both fast and reliable. It is also fully BABT approved.

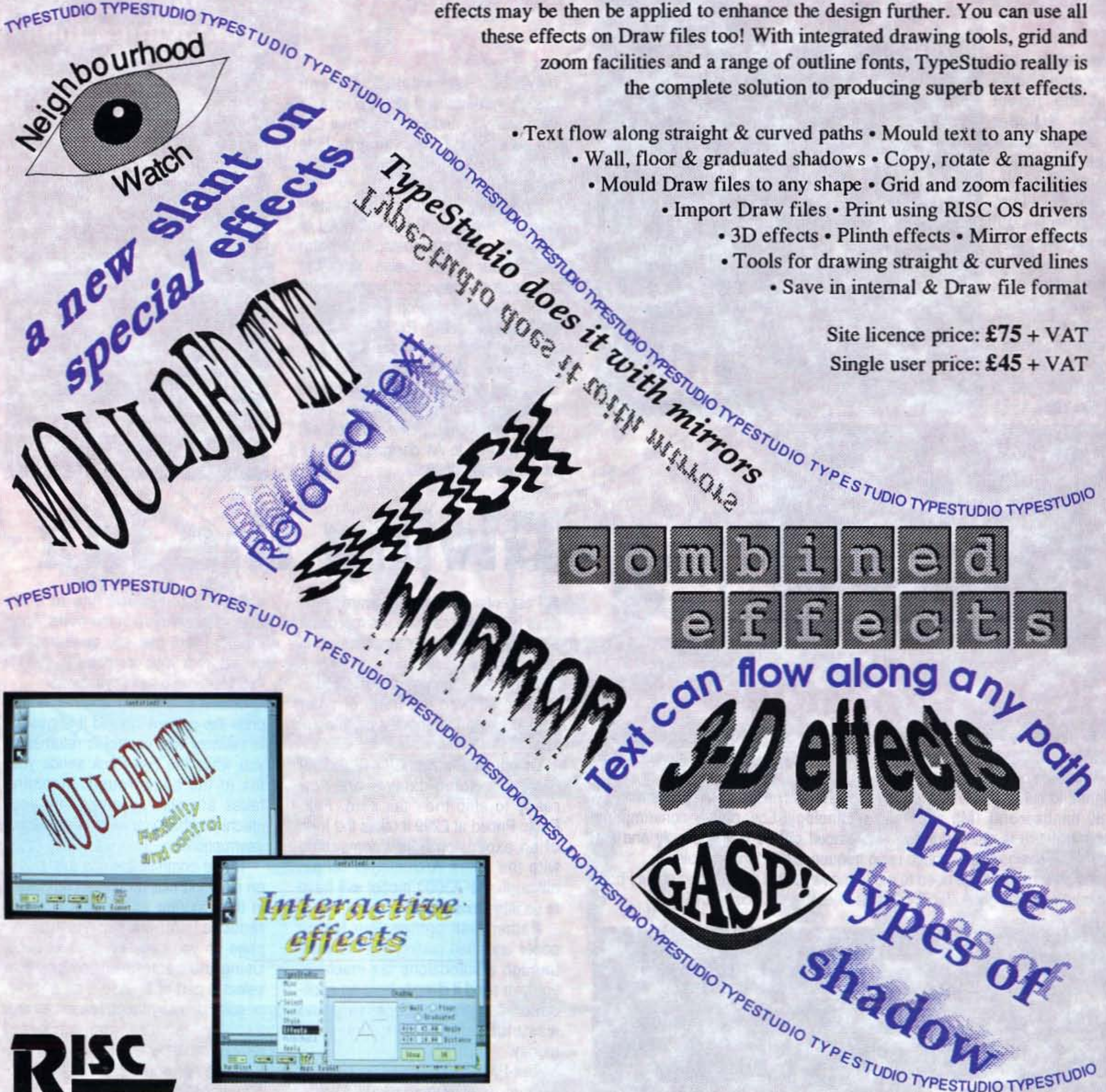
TYPESTUDIO

THE **COMPLETE** TEXT EFFECTS PACKAGE

TypeStudio allows outline fonts to be manipulated to produce high quality adverts, posters, banners, logos, letterheads etc. - the possibilities are endless. Text may be flowed along straight or curved paths, or moulded to almost any shape. A wide range of interesting effects may be then be applied to enhance the design further. You can use all these effects on Draw files too! With integrated drawing tools, grid and zoom facilities and a range of outline fonts, TypeStudio really is the complete solution to producing superb text effects.

- Text flow along straight & curved paths
- Mould text to any shape
- Wall, floor & graduated shadows
- Copy, rotate & magnify
- Mould Draw files to any shape
- Grid and zoom facilities
- Import Draw files
- Print using RISC OS drivers
- 3D effects
- Plinth effects
- Mirror effects
- Tools for drawing straight & curved lines
- Save in internal & Draw file format

Site licence price: **£75** + VAT
Single user price: **£45** + VAT



TYPESTUDIO TYPESTUDIO TYPESTUDIO TYPESTUDIO
Neighbourhood Watch
a new slant on special effects
MOULDED TEXT
Rotated text
TypeStudio does it with mirrors
SHOCK
HORROR
combined effects
Text can flow along any path
3-D effects
GASP!
Three types of shadow
MOULDED TEXT
Flexibility and control
Interactive effects

RISC developments

RISC Developments Ltd.
117 Hatfield Road, St. Albans, Herts. AL1 4JS
Tel: (0727) 40303 Fax: (0727) 860263

Business Software Challenge '90s

CAN you design a piece of software to harness technology to meet the needs of business in the 1990s? This is the Business Software Challenge '90s (071-831 6262) sponsored by CA Computer Associates, the British Computer Society and Coopers and Lybrand Deloitte.

You could win prizes totalling £20,000 and see your ideas developed and marketed professionally. The challenge is open to anyone who is currently a student during the academic year 1991-2 or who was a student in the academic year 1990-1 full or part-time at any level and from any discipline.

the young business software designer competition
BUSINESS SOFTWARE CHALLENGE '90s

You can enter individually or in teams. But all entries must be submitted before April 30 1992.

So if you can clearly identify a business need, explain the business and technical benefits of your design and demonstrate how your software addresses the problem – all on a commonly available computer – contact: The Competition Secretary, Business Software Challenge '90s, 24-28 Bloomsbury Way, London WC1A 2PX.

The winners will all be invited to attend the competition award ceremony in London in July.

The overall winner will receive £3,000 for the project which best combines a practical business solution with an elegant and creative software design. The prize for best business solution is £1,500 while other prizes are of hardware and software.

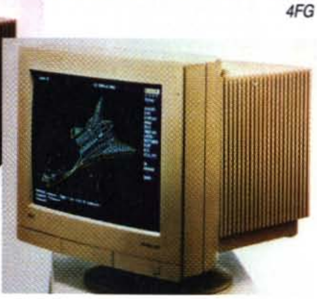
Support has come from leading business, trade and educational organisations as well as senior academics across the UK and the Business Software Challenge has recently been endorsed by Tim Eggar MP, Minister of State for Education.

Overall winner of the first competition, Steven Pearson commented: "This award has opened new doors for me in the computing industry, offering major opportunities to launch my career from the best possible platform".

3FG

4FG

5FG



6FG

Take your pick

IF YOU feel it's time to treat yourself to a multisync monitor, take a look at the new low radiation range from NEC (081-993 8111).

Conforming to the new EC regulations these monitors also feature Invar shadow mask technology giving a 20 per cent brighter picture, dynamic beam focus for perfect corner-to-corner focus and FullScan for 29 per cent greater edge-to-edge image area when compared with conventional CRTs.

The MultiSync 3FG retails for £599 and supports VGA up to the new extended SuperVGA standard. Other monitors in the series are the 4FG which costs £749 and the MultiSync 6FG, priced at £2,499, which is suited to CAD and specialist DTP applications with its large 21in screen. All monitors come with a two year warranty.

Talking Oz

FIRST Warrimoo Scouts from New South Wales had a hi-tech side to their recent jamboree – Jota '91. With eight BBC A3000s they found themselves online with the OzWorld bulletin board. A simple self-booting text-editor automatically saved messages every 10 seconds.

The bulletin board system consisted of an A540 acting as the interface and converter between the A3000s and the BBS which was a 286 IBM PC compatible fitted with a high-speed modem and a 500cps Star printer.

The scouts were now ready to talk to the UK. Despite some technical hiccups and the time difference messages were sent across the world for the whole three days of the event.

Another A3000 with a hard disc and laser printer was introducing scouts and leaders to the wonders of DTP, creating posters and hand outs for the event. In addition the A540 was connected to a Canon Ion Still Video camera capturing the action as it happened.

New from Pineapple

TWO new products have been launched by Pineapple Software (081-599 1476). The first is a new version of Digitiser. This will capture a sequence of frames with a predefined gap between them. Every third frame is the fastest, with up to hours delay possible should you want time-lapse images. The replay option allows you to see what happened at any speed.

A brand new product for Pineapple is the PAL Decoder priced at £79. Switchable composite video or SVHS inputs will mean that this will complement the PAL coder.

The Decoder could make your monitor work as a TV set or SVHS TV monitor, as well as act as a SVHS adaptor for the Pineapple Digitiser or any digitiser which needs RGB and Sync inputs. A second version is under development to provide an Y, RY, BY and Syncs output for professional users.

Font update

OVER the last two months the Electronic Font Foundry (0344 28698) have developed a further 11 font families – all properly hinted and scaffolded.

They are now producing two catalogues. A small overview is available free of charge, but the second is a large ring bound volume. With one page dedicated to each font, the price of £15 includes a year's subscription to new pages as new fonts are released.

Fonts can also be produced for individuals, as well as draw files and special font characters based on company logos and the like. They will all work with any application using the Outline Font Manager. Fonts will work on all the Archimedes range, but some in the new A5000 format will be released shortly. These feature an extended character set and include built-in kerning data.

Diary dates

The Education Show
March 5-7
NEC, Birmingham
Contact: EMAP, 071-404 4844

Sponsored by the National Curriculum Council this is the second annual show. Again stressing the practical aspects of education, this show has a wider curriculum base.

Midi Music Show
April 24-26
Hammersmith, London
Contact: Westminster Exhibitions, 081-549 3444

This third show is aimed at musicians and anyone interested in computers and music, for making sounds in their own right or for incorporating them into bigger and better things.

IDE Hard Disc Upgrades
for the Archimedes & A3000

SPECIAL OFFER
A3000 Internal
Drives from
only £195

What is IDE?

IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard drives to personal computers and is used in the new Acorn A5000. Our drives all feature a memory cache system, which when coupled with our custom designed 16 bit interface give very fast access times indeed. Typically 50% faster than the Acorn ST506 drives used on the 300 & 400/1 ranges.

What drive options are available?

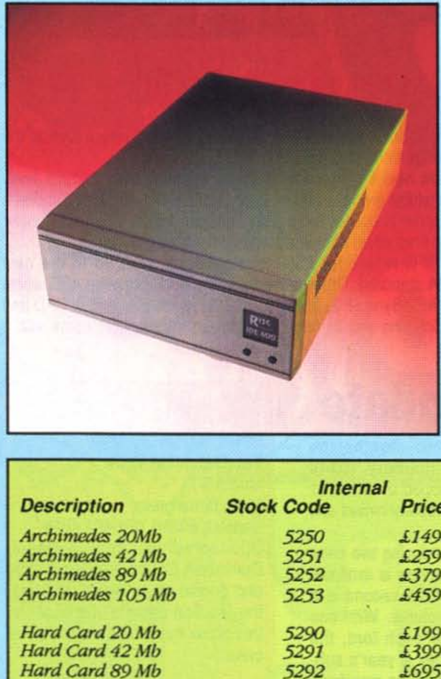
Archimedes 310, 440, 400/1 and 540.

Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.

These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively cased to match the computer and have their own internal power supply and fan. One interface card may be used to control both an internal and an external drive.

A3000

Our A3000 external solutions consist of the 16 bit IDE podule in a special metal podule box which fits to the back of your A3000 (under the monitor stand). Drive sizes are 42 Mb, 89 Mb or 105 Mb. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" drives are available in 20, 42 and 89 Mb formats and have access times of 23ms.



Hard Cards

These are 2.5 inch hard drives mounted onto our 16-bit interface card for fitting into a standard podule slot in a 310, 400 or 540 computer. They are particularly useful when you already have one internal hard drive and want to fit a second.

What does the future hold?

IDE is a relatively new interface standard, but has already gained massive support. It has been endorsed by Acorn in the A5000 and is clearly the way ahead for users of Acorn systems. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

Quality

You may have total confidence in our products. Only the best drives from recognised manufacturers are used, Conner, Seagate, NEC etc. All drive kits are supplied with full fitting instructions and a user guide to ensure that you will have no problems at all. Our interface conforms fully with Acorn's IDEFS specification.

Money Back Guarantee

If for any reason you are dissatisfied with one of these products we offer a full 14 days money back no quibble guarantee.

	Internal		External	
Description	**Stock Code**	**Price**	**Stock Code**	**Price**
Archimedes 20Mb	*5250*	*£149.00*	*N/A*	*------*
Archimedes 42 Mb	*5251*	*£259.00*	*5261*	*£349.00*
Archimedes 89 Mb	*5252*	*£379.00*	*5262*	*£469.00*
Archimedes 105 Mb	*5253*	*£459.00*	*5263*	*£549.00*
Hard Card 20 Mb	*5290*	*£199.00*		
Hard Card 42 Mb	*5291*	*£399.00*		
Hard Card 89 Mb	*5292*	*£695.00*		
A3000 20 Mb	*5270*	*£195.00*	*N/A*	*------*
A3000 42 Mb	*5271*	*£399.00*	*5281*	*£359.00*
A3000 89 Mb	*5272*	*£695.00*	*5282*	*£479.00*
A3000 105 Mb	*N/A*	*------*	*5283*	*£559.00*

All prices include High Speed IDE Drive Interface, Manual & Fitting Instructions.

All prices are Ex VAT

Available from your local dealer, or directly from RISC Developments (please add £9 carriage).

RISC developments

RISC Developments Ltd is an associated company of BEEBUG Ltd.

RISC Developments Ltd, 117 Hatfield Road, St. Albans, Herts AL1 4JS
Tel. (0727) 40303 Fax. (0727) 860263

This advertisement was produced entirely with Ovation DTP from RISC Developments

CUMANA SCSI

CD story ... continued

CUMANA have introduced a new range of SCSI cards using Acorn's powerful CDFS rom. Designed to link the Archimedes ranges to most of today's CD Rom drives, they also support the full range of SCSI peripherals – including fixed and removable Winchesters and read-write magneto-optical drives.

There are three models in the range – the CA 006, CA 007 and CA 008. The CA 006 is designed to plug into the expansion slot of the Archimedes 300 and 400 ranges as well as the 540 and new A5000. The CA 007 though is fitted externally as needed by the BBC A3000.

Both interfaces support high speed 16-bit transfers across the expansion bus. If a MEMC1a chip isn't fitted the interfaces will automatically work in 8-bit mode.

The CA 008 is also designed for use with the BBC A3000, but this model fits internally, supporting high-speed 8-bit transfers across the expansion bus of up to 1.2 Mb per second.

Compatible with both ARM2 and ARM3, they also have support for fully interrupt-driven software enabling the interface to make efficient use of the CPU. Prices start at £130.

Clubbing

HARDWARE giant Cumana (0483 503121) have launched a new scheme called the Computer Club. Designed to provide schools with the very latest in computing equipment and to put back over £100,000 into education. Contact Cumana for more details.

Making room

AS continued success encourages Computer Concepts (0442 63933) to expand their Gaddesden Place HQ – by rebuilding the south wing, demolished some 20 years ago – they are making some immediate room by clearing out some of their older 8 bit Acorn products.

BBC bargain hunters stand by as the BBC Inter-Base Rom is reduced to £20 per copy, while the Speech Rom, Accelerator BBC Basic compiler, Termi and Communicator communications roms are all down in price to £10 each.

Asked to comment, MD Charles Moir remarked: "Sales of our Archimedes products have now completely taken over from the older BBC products, although we still do sell a surprising amount of BBC software.

Ground control

AFTER writing both Interdictor and Mig29 flight simulators, programming team Simis (0483 233048) are poised to release a Flight Simulator Toolkit.

Based on their home-grown software used to create Interdictor, the toolkit will allow you to create your own scenarios, aircraft and targets. Breaking down into four major parts it consists of the Ground editor – used to define scenarios in terms of roads, rivers and so on, enabling you to interface with the simulation framework. The 3D shape editor – is used with the objects that populate the scenes, and to define your own craft.

The Aircraft model editor, defines the flight characteristics of your aircraft, while the Cockpit editor positions and animates the aircraft instruments in the sprite-based instrument panel.

Once it's designed, you can fly your aircraft around the world you have created. A library of pre-defined shapes and aircraft models – from a Cessna to a Tornado – is provided as standard. For £44.95 you have all you need to create your own alternate realities and explore them, whether imaginary or a facsimile of your own base airfield.

FREEBIES

WORTH OVER £20,000

CIS HAVE a host of new games and programs for the Archimedes, all due for release this month and they are making two offers exclusively to readers of *The Micro User*.

The first option – over £200 of new products

Following on from their successful and addictive Mah-Jong Patience, CIS (071-226 3340) have launched the full blown game with all the complexities and intricacies of the original table-top version.

Using the western rather than the original Chinese rules, it is aptly called Mah-Jong European – The Game. There's a free copy – worth £22.95 – available to the senders of the first five entries to be pulled out of the hat.

On a more serious note, if you find that your fingers are letting your computer skills down, wasting time and energy, Turbo Type could be the answer. Flexible, with special facilities for the sight impaired, it is an easy way to improve your typing skills using the keyboard you use normally.

Written primarily for Archimedes users, it will increase your productivity as you progress through the levels. CIS have five free copies – normally priced at £24.95 – waiting for you.

The second option – £20,000 of free games

If you are not one of the 10 lucky readers don't despair, CIS are making a very special offer. If you order ANY of their products, from the new Mah-Jong, Mr Doo or the Sound FX Maker to the powerful National Curriculum administration package – PIPP, you have a choice of one of their many games absolutely FREE including:

Memory Magic – can you remember which items you last saw?

Crisis – are you up to the strain?

Mah-Jong Patience – totally additive and fascinating.

Jinxter – a Magnetic Scroll's classic adventure.

Corruption – find the real culprit in this City-based adventure.

Word Up Word Down – ideal for crossword enthusiasts.

Star Trader – saving the universe is the name of the game.

Fireball II – a superb implementation of classic Breakout.

There's something for everyone from wheeling and dealing in the City with Magnetic Scroll's excellent Corruption, to trouble among the stars with Star Trader. Or why not opt for games to tax your little grey cells: Memory Magic and Mah-Jong Patience? With £20,000 of games up for grabs, the choice is yours.

What to do

The first 10 readers' names and addresses pulled out of the sack after 28 February will receive a FREE copy of Mah-Jong European or Turbo Type. Just write to: **Micro User Freebie Offer, CIS, Suite 2a, 436 Essex Road, London N1 3QP.** Make sure you specify which product you would like to receive.

To take part in the Free Game offer, just cut out or photocopy this offer and send it with your order to CIS. Again specify which game you would prefer.

BEEBUG The Archimedes Specialists

A3000 Hard Drive DTP System

If you have been thinking of getting an A3000 there has never been a better time.

This special offer provides an excellent system ready for immediate use. The hard drive, RAM and Ovation are all installed ready so you can simply turn on and start.

Ovation is the highly acclaimed package combining word processing and DTP. Widely used in education it offers a whole host of features and is powerful and yet simple to use.

Our high speed IDE drive was designed especially for the A3000. It has an access time faster than ST506 or 8 bit SCSI, features auto-parking and sleep mode and is fitted in the internal expansion slot.

- ☐ Acorn A3000 Computer
- ☐ Genuine Acorn Colour Monitor
- ☐ Monitor Plinth
- ☐ 2 Mb RAM
- ☐ 20 Mbyte Internal Hard Drive
- ☐ Ovation DTP

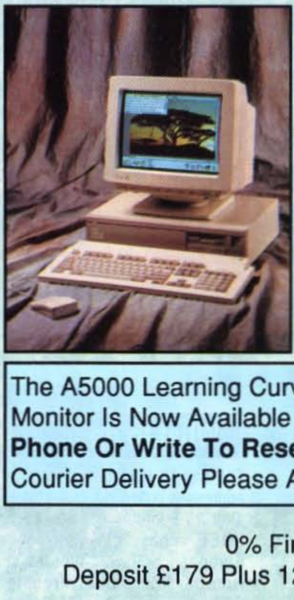
Normal Price £1299 + VAT
Save Over £300

Special Offer £999 + VAT
(£1173.83 INC VAT)

The A3000 Learning Curve is also available if required. This includes Pacmania & Lemmings games, Genesis II Database, 1st Word Plus, Acorn PC Emulator and a 120 min audio training tape. Just add £40 + VAT (£47.00 inc VAT).

Courier Delivery Please add £9.00.

The A5000 Learning Curve



The A5000 is now available from BEEBUG, either from our showroom or mail-order.

BEEBUG are one of Acorns largest dealers and have been supporting the Archimedes range since its launch.

You can have total confidence in BEEBUG. Our technical team are always on-hand to provide any assistance and help that you may need with the A5000.

BEEBUG & RISC Developments also produce the magazine RISC User, dedicated to the Archimedes range.

BEEBUG - The Archimedes Specialists

A5000 Features

- ☐ RISC OS Version 3
- ☐ ARM 3 For Unbelievable Speed
- ☐ 1.6 Mb Format Floppy Drive
- ☐ 40 Mb IDE Hard Drive
- ☐ Acorn Multi-Scan Monitor

The New Learning Curve Pack

- ☐ New Multi-tasking PC Emulator
- ☐ Genesis 2 Database
- ☐ 1st Word Plus Wordprocessor
- ☐ Acorn DTP
- ☐ Lemmings and Pacmania Games
- ☐ Audio Training Tape
- ☐ Optional 300 dpi Ink Jet Printer

The A5000 Learning Curve Complete With Acorn Multi-scan Monitor Is Now Available For £1799 Inc.
Phone Or Write To Reserve Yours Now !
Courier Delivery Please Add £9.00.

Educational Establishments
Please Ask For Our Educational A5000 Price

0% Finance Over 12 Months NOW AVAILABLE ON THE A5000.
Deposit £179 Plus 12 payments of £135. APR 0%. Please ask for a finance application form.

BEEBUG

Phone Or Write For An Information Pack
All products covered by 12 months full warranty
Access / Visa / Switch / Cheque / Official Orders Welcome
Showroom hours Mon to Sat 9 am - 6 pm (Thu until 8 pm)

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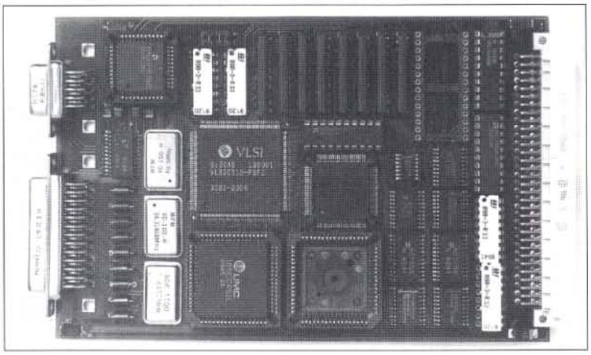


Expanding PCs

RECENTLY unveiled is Aleph One's (0223 811679) 386 PC Expansion Card. Priced at around £600 it provides a PC on a standard podule expansion card.

This enables applications designed for IBM and compatible PCs to run on the Archimedes. Used with the PC Emulator your Archimedes will become a real PC running on the Risc OS Desktop – running 12 times as fast as the emulator on its own.

An optional 387 maths coprocessor gives you a 20MHz 386SX PC to provide a little extra speed that will deal with complex PC programs such as Microsoft's Windows 3.

Parallel and serial ports allow peripherals such as printers and modems to be connected directly to the PC Expansion Card. There is also somewhere to plug dongle software protection devices used by PC applications. The card has up to 4Mb of ram of its own so that it need not disrupt work on the Archimedes.

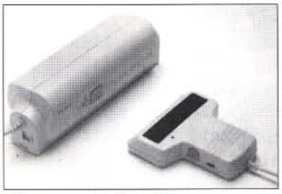
On the wire

A NEW presentation package, CableNews, has been developed by X-Ample Technology in Holland. Written for the Risc OS environment it's being published by Lingenuity (0986 85477).

Allowing presentations to be compiled and shown on any Archimedes, CableNews can use data, charts and so on prepared in other Risc OS packages. It comes as two applications: !CableMake and !CableView. The former is the authoring system while the latter plays back the presentation.

Launched at BETT at the same time was Presenter GTi. Priced at £69.96 this graphics package offers a wide selection of graphs including horizontal and vertical bar charts, stacked bar charts, choice of line and area charts, a variety of pie charts, scattergrams, logarithmic scaling axes and so on.

Designed to be simple and effective it retains a number of the original Presenter features including dynamic worksheet area, full auto-scaling axes, live update of graphs from PipeDream, selectable graph colours, line and point types, fast redraw of graphs and exportable graph data as formulae components.



Scanlight prices down

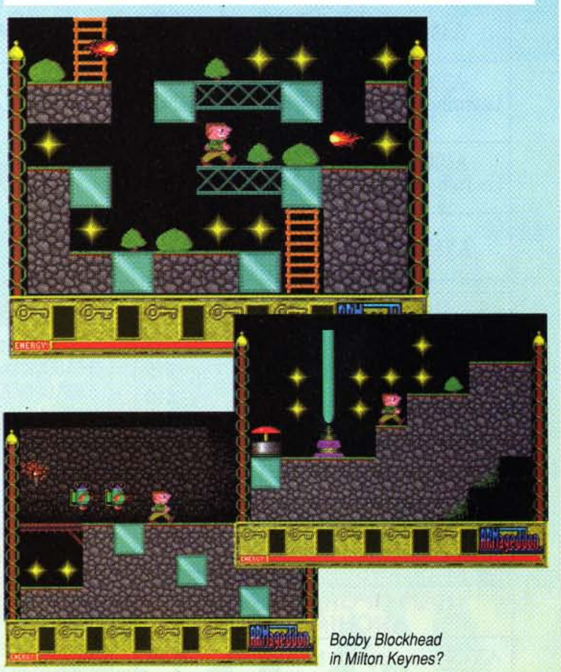
PRICE cuts galore this month. The ScanLight range of scanners from Computer Concepts (0442 63933) has been reduced in price. ScanLight Junior goes down in price from £189 to £129, while ScanLight A4 now is reduced by £100 to £299, with the ScanLight A4 sheet feeder offering A4 scan width up to 400 dpi now priced at £399.

Computer Concepts have also announced an updated version of the software for ScanLight Plus. Version 2.0 now offers improved grey-scale control using a bezier curves along with simpler brightness and contrast controls.

It also includes some image enhancement functions. Its real-time greyscale dithering can produce near photographic results. Good news for existing users is that the upgrade is available free of charge.

FREEBIES

WORTH OVER £400



Bobby Blockhead in Milton Keynes?

NEW software house Atomic Software have just released a game ideal for any Archimedes arcade adventure freaks in search of thrills and spills.

Bobby Blockhead versus the Dark Planet has the definite taste of 1950s science fiction horror. If you have an aversion to large wasps and scorpions, this might not be for you.

To show that they are on the side of the good guys, Atomic Software are giving away 20 copies of the game exclusively to readers of *The Micro User*.

In addition the next 20 entries pulled from the sack will receive a demo version of the game – unique, as the three levels it includes are totally different from the ones in the full game.

So what is so special about Bobby apart from a toothy smile and clean cut appearance? His curriculum vitae tells of his training as a crack soldier and a certain interest in pot holing. But one day while on army manoeuvres in Milton Keynes, he was captured by aliens from the Dark Planet.

A soldier's first duty is to escape and with your help that's what he'll do. Traversing ladders, lifts, transporters while avoiding manic robots and mutant members of the insect fraternity he will travel through levels of complexity collecting Wattinium crystals to save his own skin and the future of his home planet.

What to do

To get your own copy of this game simply write to: **Micro User Freebie Offer, Atomic Software, PO Box 118, Peterborough PE1 5QH**. There are 20 full games and 20 demos available to the first 40 readers whose names are pulled out of the sack after 28 February.

FREE
1 YEAR'S
ON-SITE
MAINTENANCE
with Archimedes
Micros

College Computers

FREE
DELIVERY
on all
Archimedes
Micros

ARCHIMEDES

SYSTEM	ENTRY	COLOUR	MULTISCAN
A3000	£599	£819	£849
A3000 Learning Curve	£642.29	£885.05 INC STAND	£892.29
A420/1 Learning Curve	£1114.83	£1334	£1364
A540/1	£2495	£2715	£2745

SYSTEM	ENTRY	COLOUR	MULTISCAN
A5000 1Mb RAM floppy drive	£999	£1219	£1249
A5000 2Mb RAM 40Mb HD	—	—	£1499
A5000 Learning Curve	—	—	£1531.06
A5000 Learning Curve and Printer	—	—	£1765.96

A3000 ACCESSORIES

3.5" External Drive	£97
Monitor Stand	£15
External Podule Case	£12
Serial Upgrade	£16
A3000 Technical Manual	£28
Dust Cover Micro/Monitor	£5
Dust Cover Micro	£9
User Port/Midi Upgrade	£44
UHF TV Modulator	£29

RAM UPGRADES FOR ARCHIMEDES

A3000	Upgrade to 2Mb RAM	£49
A3000	Upgrade to 4Mb RAM	£164
A305	Upgrade to 1Mb RAM	£48
A305/A310	Upgrade to 2Mb RAM	£229
A305/A310	Upgrade to 4Mb RAM	£419
A410/1	Upgrade to 2Mb RAM	£37
A410/1	Upgrade to 4Mb RAM	£99
A410/1	Upgrade to 8Mb RAM	£725
A420/1	Upgrade to 4Mb RAM	£72
A420/1	Upgrade to 8Mb RAM	£679
A440/1	Upgrade to 8Mb RAM	£569
R140	Upgrade to 8Mb RAM	£569

CONCEPT KEYBOARDS

A4 Standard Keyboard inc BBC Software	£115
A3 Standard Keyboard inc BBC Software	£140
A4 Archimedes Keyboard	£116
A3 Archimedes Keyboard	£141

PLOTTERS

ROLAND		SKETCHMATE	£320
DXY-1100	£494	GRX-300	£2560
DXY-1200	£625	GRX-400	£3425
DXY-1300	£829	DPX & GRX Include	
DPX-2500	£2348	12 months on-site	
DPX-3500	£2960	maintenance	

ARCHIMEDES ACCESSORIES

NEW Multitasking RISC OS	£28
3.5" 800K 2nd Floppy Drive (305/310)	£109
5.25" 800K External Floppy Drive	£84
I/O Podule (Analogue & User Port & 1MHz Bus)	£75
MIDI add-on to I/O Podule	£27
MIDI Expansion Card	£64
Econet Network Board	£43
IEEE Interface Adaptor	£265
16 Bit Parallel I/O Card	£193
Software Developers Toolbox	£147
Floating Point Unit	£449
SCSI Adaptor Expansion Card	£159
Keyboard Extension Lead	£5
2 Podule Backplane	£24
4 Podule Backplane	£37

HARD DISK DRIVES (ST506)

20Mb for 410 ST506	£159
40Mb for 410 ST506	£235
53Mb for 410 ST506	£POA
A3000 20Mb + Podule	£335
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MU2

THE MAD hatter

Hatter's Helpline

Like all the best readers of this magazine, Daniel Leong is an adventure enthusiast as well as an Elite addict. Daniel has a query concerning the Level 9 game **Lords of Time**.

He asks if the keys under the shed are a red herring, and if not, how he can get them. It's part of quite a long chaining puzzle – and it certainly isn't a red herring.

You need to tie the two short planks together so that you can cross the stream. Then you must give the Narcissus the looking-glass so that it can admire itself – you need to know your ancient mythology for this one.

The delighted flower rewards you with a lodestone: This is magnetic so waving it outside the shed will attract the keys enabling you to open the door.

There is an axe inside which you need in order to get the first truly valuable item. Go to the weeping willow and wave the valerian: You will be told that the tree is suicidal. Chop it, and a teardrop is yours for the taking. This teardrop is one of the nine ingredients you need to defeat the evil timelords.

I have just received a sample of a tool that many adventure gamers will find useful if you prefer the pictorial mapping system to my own logical mapping system.

It's called the Adventure Mapping Pad: On one side of the paper are squares waiting to be joined up and annotated. On the reverse are four columns in which you can make notes on each location and what is found there.

I've not got a price but interested readers should phone 0204 791525 and ask for M. Birkett. I'll try and include a sample, and deal with mapping in general in future.

Warm work

CONTINUING our explorations of the Level 9 classic *Adventure Quest*, we shall soon find that our patience has been rewarded: You haven't peeped through that locked door, have you? Anyway, it's time to use the keys and pass north through the menacing portals. Those guardian gargoyles have a function, you know.

I suggest you save your current position before actually entering the cave, because there is an Orc archer busily trying to polish you off. It's a random event, but can be very annoying if you have completed the first part of this section only to be unceremoniously bumped off. I wouldn't mind so much, but the Austins use such scathing language when it happens.

Arm yourself with the amulet, eye, keys and – of course – the lamp, and unlock the door. You can now discard the keys and enter the cave, moving steadily north. Ignore the web covered stalagmite for the present, together with any falling arrows, and continue north until you come to the small dead-end room.

Here you'll encounter an elf who probably would like to be called Horatio since he lacks an eye. Anyway, give him the emerald eye and he will repay you with a rune-encrusted sword. This will turn out to be a very useful weapon during the next couple of stages.

Make your way back from the elf's location to the foot of the web-encrusted stalagmite and start clambering up. Eventually you'll come to the spider's lair where the Earthstone awaits you. Take it, but don't fret when the spider tries to mug you. Fret even less when it falls to the floor only to be picked up by an overjoyed Orc.

Plod back down to the floor of the cave and then go south, west and west to the junction between the North/South and East/West passages. One more move north will enable you to surprise the Orc archer and scare him off. Carry on north to the ledge and the rope bridge.

Cross the bridge by moving east and then at the entrance to the Orc lair go south, so as to avoid the unruly creatures, and south again. From here a move west should find you in a store room where the Earthstone has been cached by those thieving monsters.

Retrieve the jewel and retrace your steps to the rope bridge. As you cross it, you'll find that something has alarmed the Orcs and they are now in hot pursuit. Fortunately the sword will cut the rope bridge leaving them isolated and frustrated.

Two more moves south and a couple east will bring you back to the south side of this huge cavern complex. Drop your sword here and go out of the cave to the lakeside. Take the bottle and move down to enter the water (the command In will take you back inside the cave) without worrying about the lung-fish. Provided you enter the following moves you can just do everything without drowning: *Down, Fill Bottle, Up, Light Lamp.* Now you are ready to go back inside.

This section of the adventure is loosely based on the part of the book Lord of the Rings covered in the chapters entitled *The Stairs of Cirith Ungol* and *Shelob's Lair.* If you had tried to re-enter the cave while carrying a weapon an alarm would have been triggered, and the iron door would shut firmly in your face. That's why I insisted you left the sword just inside the door.

Entering the cave once more, you should leave the sword where it is for the moment and proceed north twice and then west twice to where you encounter a message about rising hot air. Two further moves west will enable you to encounter an acquisitive dragon who, being resolutely rotund, fills the small cave.

Throw the bottle of water while calling out *catch, boy* and the monster will munch the missile only to find that his ardour has been thoroughly quenched.

Your next move is to trot back for your sword, which you can now carry once more, and then return to the smooth cave. A further move north will take you to the dragon's lair and an egg.

This egg will prove to be the most valuable tool of all in defeating the evil Agalariept, so I'll make you wait for more till next time.

Until then, happy adventuring.

Into the deep

Last time I left you in the stables where the lamp and key were to be found in Barbara Gibb's solution to **Castle Blackstar**.

It means that we can now venture below ground, but first a visit to the Temple is required so the moves are: Exit, east, east, and east to the castle front. Drop the knife here and continue east until you come to the dense woodland and then move northeast to the clearing and enter the Temple.

Examine the altar to find a carving of the goddess, pay (or pray) your proper respects to get a vision telling you how the adventure must be completed: Essentially, you need to get an Orb into orbit. Meanwhile, drop the eggs and the violin.

Make your way back to the castle front and then go south and west so that you are behind the castle and go down the well. Take the coin and, at the same time, (since you are standing in a pool of oil) fill the lamp. Making too many moves in the dark results in your being attacked by a Deoden, so a lit lamp in the dark is essential.

From here, go north and up to the crevice cave: Drop the bar there and it will fall through the crevice to the room below. Move down to the damp passage again and then north to the iron door. Since you have the keys you can unlock it and continue north until you encounter the doorway with the button and the warning. Read the warning, as it gives a clue as to what happens next.

Go west twice and examine the statue: Don't fret about the fact that you can't get your sticky paws on the diamond yet. Instead, push the statue into the Long room so that it is standing on top of the square tile. Go back east and push the button to trigger the trap door so that the statue crashes down below. Don't try to re-enter the Long Room since you aren't wearing your MCC tie, move south instead, then southeast and down. Now you can take the diamond. The next moves are southeast and east to the place where you are shoved about a bit: Throwing the flour will reveal and mortify the gnome who promptly flees, enabling you to move east twice and retrieve the iron bar which you dropped through the crevice.

Take the bar, move north and drop it again. As soon as you take the goblet the walls to the north will start to move together, but the bar prevents them from closing completely. Go north, but leave the bar where it is, and exit through the narrow doorway.

Next make two moves east and two northwest to the north ledge and read the message there. Now go down and then northwest to a chapel and take the cross.

The final moves for this session are as follows: Northeast to the cell block, unlock the cell, enter and pull the torch to open a section of the north wall. You can now go north and east and put the lamp out (*Off Lamp* is the required input). Drop the keys, take the vase, turn the winch to open the grating and exit the tunnel.

Southeast, west, southeast are the moves which get you back in the valley, and then east, northeast and enter bring you inside the Temple. Drop the diamonds, goblet, coin, cross and vase – and wait for more instructions next time.

To be continued.

I have had the most extraordinary and interesting letter from a stripling called William Painter: He's been exploring in a way that no other Commander has yet achieved. You'll see this by the following extract from his letter.

> *I was an ordinary merchant in Galaxy 1. Suddenly, as I was hyperspacing from Relaes to Ra, I turned up in Galaxy 33.*
>
> *Could you please tell me whether there are meant to be this number of Galaxies. I had about 10 million Credits, but all my lasers were now Mining Lasers although my status said they were Pulse Lasers.*

William sent a disc with four saved files on it indicating that he was on Galaxies 33 to 36 respectively, and so I was able to verify his claims. In fact, the amount of money he picked up was 170203470.6 Credits and I added a couple of files to my own collection.

Sadly, when I tried using Galactic Hyperspace from Galaxy 33, I finished up in Galaxy 2. In the same way, when I tried moving from Galaxy 36, I ended up in number 5. William has a Master 128, so I wonder what little bug has been tweaked: Interesting, though, isn't it?

For those of you who have typed in the Elite Cheat program that I featured some issues ago, here are some notes sent in by Daniel Leong. First he deals with obtaining an enhanced energy unit.

Delete line 2430 and add the following line:

```
1785 file%?&2B=8
```

Daniel also comments that you can (within reason) use higher multiples of 8 to get even faster recharging.

If you fancy an infinite Galactic Hyperspace drive, add the following line:

```
1786 file%?&2D= (any number apart from 0 or 255)
```

There is a slight price to pay for this facility: Using it changes your legal status to Fugitive. However, according to Daniel, Police Vipers never seem to bother you.

He also adds that if you have 25.5 units of hyperspace fuel you can jump from one edge of a galaxy to the other.

The final comment in his letter deals with entry into Witch Space: He says that you can do so every other hyperspace jump using the following procedure. Pause the game, press X, restart the game, hyperspace to somewhere nearby and hold down Control+H during the hyperspace pattern.

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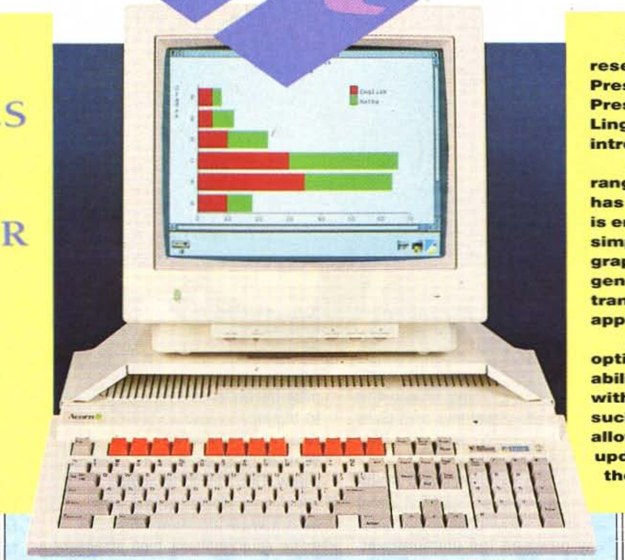

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EDUCATION Update

Turtles and teddies

LOGO and turtle graphics have been known to reduce teachers to tears, but a possible light at the end of the tunnel comes in the form of ScreenTurtle from Topologika (0733 244682).

Promoted as an easy-to-learn, easy-to-use, turtle graphics program it is available for the Archimedes range for £39.95 – a demonstration disc is available too.

Similar in appearance to other programs, ScreenTurtle is *intelligent* because if it doesn't understand your command, it'll guess. Written by Marshal Anderson, the parser is able to cope with a variety of commands – RIGHT, RT and CLOCKWISE are equally successful for instance. One particularly useful feature is a mouse controlled on-screen help system.

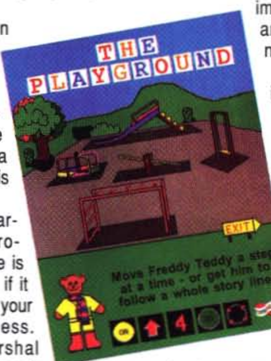
The standard features are all present as well as some special features which add more maths functions. For instance the ability to use absolute directions such as BEARING and HEADING, as well as left and right turns, + and - Cartesian co-ordinates, extra command words MOVE, DRAW and VECTOR, the ability to specify random distances and direction, plus recursion, to name but a few.

For the more artistic there are options to fill a shape from the turtle or paint it using the mouse.

Text can be put on screen and there is a jotter to help keep track.

Still on the theme of control, **TinyLogo/TinyDraw** has been updated with new features including adjustable shapes, colours preserved on export, an undo facility, improved error checking and three pencil thicknesses.

If you send your original program back to Topologika, they'll send you an updated version for just £5 plus VAT and postage and packing.


THE PLAYGROUND

Move Freddy Teddy a step at a time - or get him to follow a whole story line!

Freddy Teddy makes a welcome third appearance too this month in The Playground. An ideal introduction to on-screen control, heralded as a sort of pre-TinyLogo, The Playground costs £29.95 which includes a free site licence.

This Freddy Teddy excursion has him in the playground waiting for children to tell him what to do. Commands can be given in real time so that he acts immediately, or you can delay his actions using the procedure mode. A procedure is built by clicking on a series of icons and his actions can be stopped to print a picture. These can be in block colour, shades of grey or simple outlines for colouring in.

Sampled speech also plays its part as Freddy helps you to count. The program offers Concept Keyboard support, work sheets and icon stickers as well as a colour booklet about the playground and two A4 Concept Keyboard overlays.

Using Genesis

ALTHOUGH a program in its own right, Genesis II also provides an authoring system for a range of projects. Leeds Educational IT are producing an interactive audio package using Genesis II and French material. Containing 60 minutes of spoken French this audio CD will support the teaching of French to Key stages three and four.

A second project will be released by Oak Solutions (0274 620423) and is based around the Battle of the Somme. Produced by Netherhall School in Cambridge, this has a multimedia approach to history. By combining soldiers' letters, contemporary music, diary of events, role of honour, still photographs, maps and text linked to sections of film from the Imperial War Museum archives, an information packed video disc has been created.

Intended as a cross-curricular resource for use with history, music and media studies among others, the complete package will include the video disc, software and classroom materials.

Alastair Wells, head of IT at Netherhall remarked: "From the pupil and classroom teachers' point of view they want an easy-to-use, meaningful package that helps them to learn so that the content of the package is the focus of the activity and not the hardware."

Classy roms

OAK Solutions (0274 620423) have come up with a alternative to a standalone hard disc for an Archimedes. The ClassRom retails from £344 and comes in 20, 45, 80, 100 or 200Mb formats.

You can use the ClassRom on a standalone machine or on a network. Using the unit on one machine provides a read-only area for information and applications. Once installed, the software on the read-only area cannot be deleted, while password protection management software allows the read-only area to be unlocked so that new applications can be added.

It is in the network environment that ClassRom comes into its own, giving fast access to applications and simple management of multiple hard discs. To change the read-only area is simple once unlocked, and the changes are then transmitted automatically around the network to the other ClassRom machines. Time consuming updates can utilise the timed start option, which will transmit information overnight for instance.

You can also use ClassRom to reset a selection of machines and remotely start applications simply by dragging the appropriate icon. For instance a teacher could transmit example files to each computer before a lesson, to remove them afterwards.

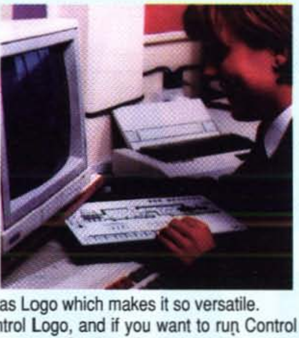
Hard driving with concepts

THE problem with the Concept Keyboard has always been that you needed specially designed overlays and software. Phobox Electronics (0705 269642) have come to the rescue with a new application called !Designer costing £20.

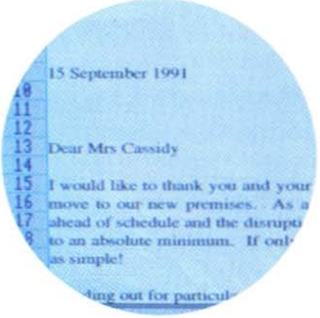
The key to this product is versatility as you can drive windows, indicators, mice and pointers in wimp and non-wimp programs. Teachers can design overlays to support specific classroom projects using the standalone program.

While overlays can be used with any applications program using text input from the keyboard, you can create your own quickly and easily. Using the mouse to highlight numbered areas on the screen to represent the cells on the Concept Keyboard, or text and special characters, you can simply assign keyboard areas.

!Concept is the application which installs the overlays. A nice point is that Returns can be included in the text strings which means that commands can be sent to Logo for example. It is !Designer's ability to access any BBC Basic program, programs working under the emulator or non-Risc OS programs such as Logo which makes it so versatile.



One of Phobox's little grey boxes is needed to run Longman Logotron's Control Logo, and if you want to run Control Logo and a Concept Keyboard Phobox have the answer. This takes the form of the Concept Control Adaptor which retails at £40. Using this piece of hardware the Control Keyboards can be used in control panel simulations to drive models and robots in science and CDT applications.



15 September 1991

Dear Mrs Cassidy

I would like to thank you and your
move to our new premises. As a
ahead of schedule and the disrupti
to an absolute minimum. If onl
as simple!

ing out for particul

PIPEDREAM 4

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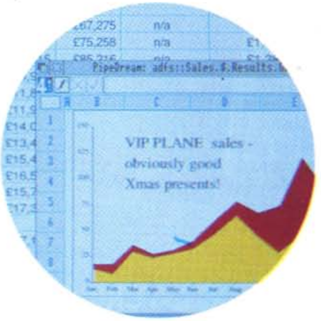
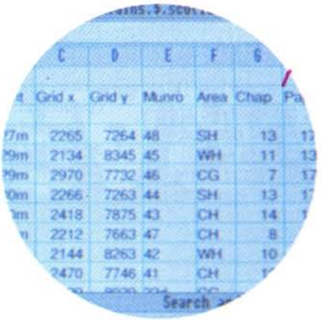


VIP PLANE sales -
obviously good
Xmas presents!



Grid x	Grid y	Munro	Area	Chap
2265	7264	48	SH	13
2134	8345	45	WH	11
2970	7732	46	CG	7
2266	7263	44	SH	13
2418	7875	43	CH	14
2212	7663	47	CH	8
2144	8263	42	WH	10
2470	7746	41	CH	

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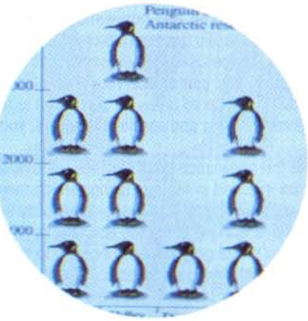
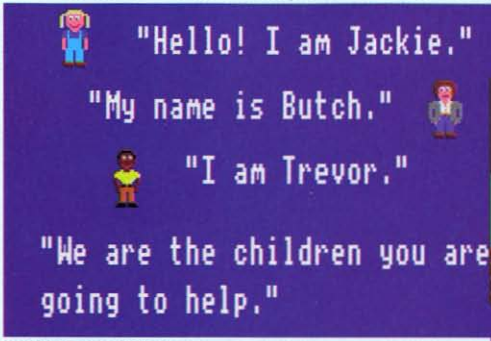




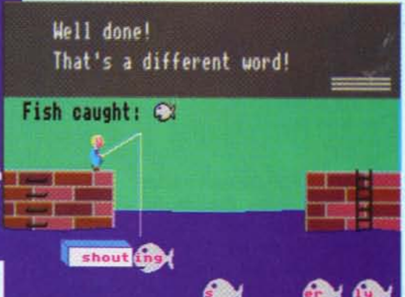
"Hello! I am Jackie."

"My name is Butch."

"I am Trevor."

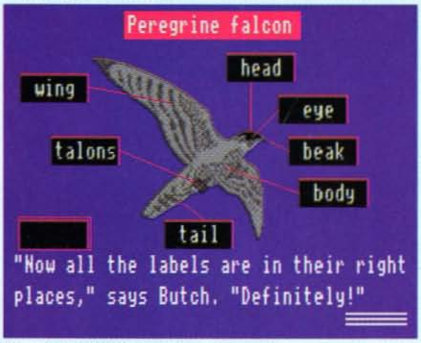
"We are the children you are going to help."

Introducing your colleagues



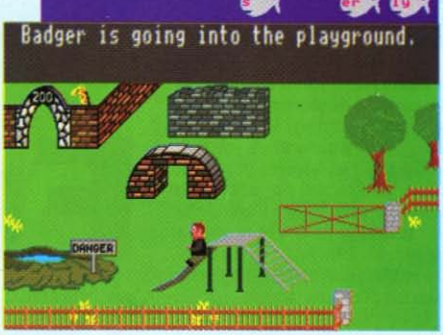
Well done!
That's a different word!

Fish caught:



"Now all the labels are in their right places," says Butch. "Definitely!"

Correctly label the body parts



Badger is going into the playground.

Trace the badger using compass points

Look what I've found

Marshal Anderson dons his deerstalker and chases a badger to save a peregrine falcon

Product: SkyHunter
Price: £22 (BBC B and Master) £24 (Risc OS)
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Tel: 0223 425558
Requirements: BBC B, Master and Risc OS

SKYHUNTER is another in the series of programs designed to back up the BBC's Look and Read TV series which has produced Geordy Racer and Dragons' Eye.

This time published by Logotron, and keeping the price at the old level, the software is available in both 8 and 32-bit versions. The Archimedes version is reviewed here, though the actual content of the other is identical.

The program is a series of mostly language activities, based around the SkyHunter story. Following the theme of the story in the TV programs, the children set out to foil the illegal sale of a bird. The narrative is quite good, the mission not immediately obvious and characters presented as nice turn out to be nasty.

The software takes you through a series of activities from meeting the characters to catching the baddies. Some of the tasks fit well into the story, others are rather contrived. Many of the activities allow the children to select a difficulty level for themselves.

We begin with the introductions. A simple memory task rearranges letters to give the characters names. Then the first game involves fishing for the right endings to words. Having caught the slippery suffixes we move on to Mr Trim's shop where we find a chest of drawers.

The chest can only be opened by arranging coloured tiles in a certain order, a simple mathematical task. A book on birds of prey is discovered along with some scraps of paper. The arrival of Mr Trim sends the children out of the shop to examine the book.

They discover that the labels on the birds are wrong and must sort these out. They also discover that Badger, a man they met while fishing who claimed to be chasing a parakeet, was in fact after the rare peregrine falcon.

Concerned to right this misconception we are invited to chase Badger through the park. This is done by providing the correct prepositions in sentences like: *He went through the gate.*

Eventually we follow him into the zoo where we have to trace his footprints using compass directions. When finally cornered he claims that he's always getting things wrong and asks us to help him label the cages for the animals.

Here we are presented with six cages and a list of a dozen or so animals. We can have clues about the animals in a given cage: *It has hairy skin, it has a long neck.* The clues are well thought out: The first one nearly always applies to two of the animals but you must ask for the second to be sure. Once all the animals are named they appear in their cages.

Now we are presented with a three by three sliding block puzzle of one of the animals which we must solve and then identify. Then we turn our attention back to the papers we found in the shop. These turn out to be the parts of a map, laid out in a three by three grid and, by swapping squares in the grid, we reproduce it. On the back of the map is a message which sends us to the tunnel. There is also a very strange sentence which seems meaningless. In the tunnel we shine our torch about and find words which rhyme with those in the strange sentence. This helps us decode it to discover the location of a secret bird sale.

Now we find ourselves at the boat house. The game here is a fairly straightforward mini-text adventure, though it is menu-driven to save children struggling with a parser. Moving around we discover the crime in progress and trap the crooks while we fetch the police. At the police station we are asked various questions about the adventures we have had.

Summing up

The contents of the program are unsurprising and sometimes quite contrived. But then, that's usually the way with this sort of thing. The games span a variety of skills and encourage a cross-curricular approach which is substantially supported by extension ideas in the teacher's manual.

A menu at the start allows children to pick out a starting point so it is possible to complete the package in stages or miss out bits which you don't think are suitable.

As a package to go with the TV series this would be quite a sound purchase, especially in those schools that like to develop a TV resource into a full blown classroom project. It doesn't really have enough about it to be worth buying for using on its own. There are better adventures that are more specifically targeted, or simply bigger, especially for the older BBC machines.

Product: Fun School 3
Price: £24.99 each
Supplier: Europress Software,
Europa House, Adlington Park,
Macclesfield SK10 4NP.
Tel: 0625 859444
Requirements: Risc OS

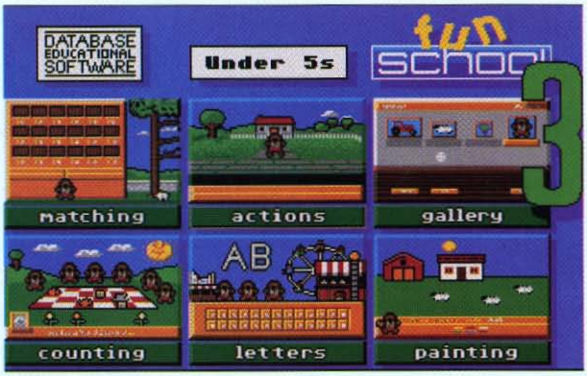
Fun and frolics

Marshal Anderson looks at the latest in home and school education – Fun School 3 for the Archimedes

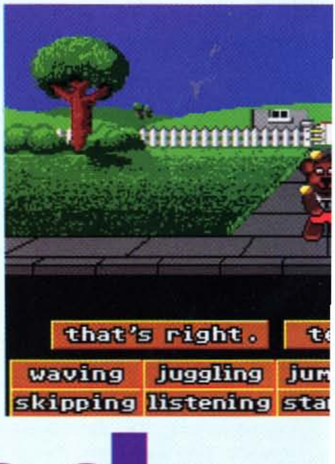
THE Fun School series has been around for quite some time now and recently the Fun School 3 programs have been implemented on the Archimedes covering the age ranges up to five, five to seven and seven plus.

The Under 5s pack is built around a Teddy character who appears in all the games. First you must help Teddy with some matching. This is a very straightforward game where you have to choose two objects of similar colour and shape. For every pair picked correctly Teddy's friend climbs up a tree until he or she reaches a branch with a penny on it. There are several levels available which introduce more complex matches.

In Actions you can tell Teddy to juggle, play, sleep and so on and at higher levels you are also asked what Teddy is doing. This is a nice game but the reading level is quite high, well beyond the target age group, so it is the sort of thing that would need to be played with an older child alongside.



The Under 5's manu



Hard but nice

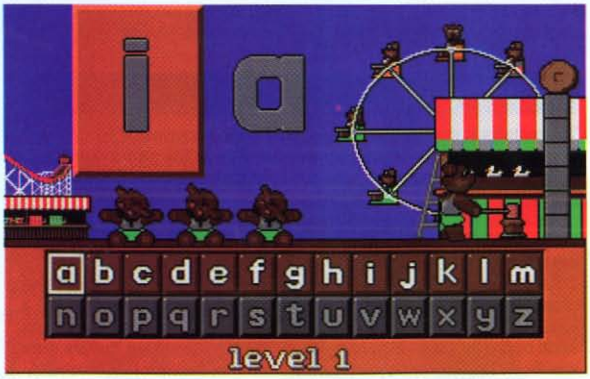
The Gallery suffers from the same problem. Here you have to match a word to a picture but the words are things like tractor, teapot and house, not the sort that can easily be dealt with phonetically and not always what you would expect to find in an early sight vocabulary. But, again, played with an older child it is an instructive game.

Counting is pitched at the correct level. You must count the number of teddies, trees, flowers or whatever is in the picture.

The nice thing about it is that not all the trees, flowers and teddies are the same which is an important concept for young children. What is rather misleading is that the prompting picture is, say, a red flower and the children might think they must only count the red ones so you will need to explain this at the start.

Letters has you matching the shape of a letter. At the lower level this is just lower case but further up you also have to match across cases which is very useful, if quite a conceptual jump.

The painting game is a good piece of open ended software with no right or wrong answers. You must build up a farm scene and can have pink sheep and a green sky if you want. This will help a child with awareness of colour and using Snippet or some such program, you should be able to print screens.



Match a letter at the fair

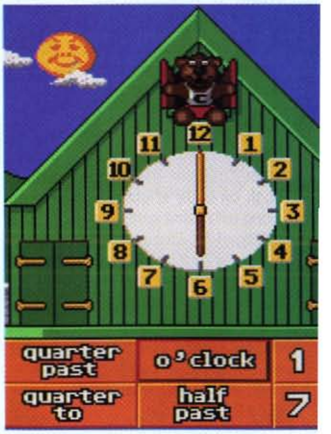
The programs don't make much use of the mouse or the Archimedes' sound capabilities which is a shame but they are all well animated, bright and jolly. The supposed age range they are aimed at is not really consistent but, because they are presented with different levels in the games, most four to five year-olds will find something of use and interest.

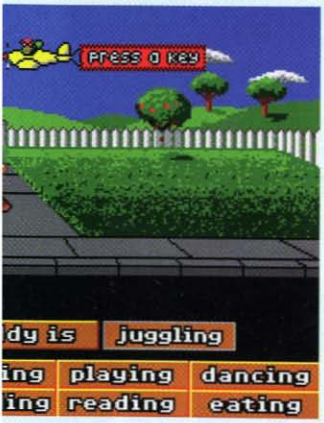
No U turn

The 5 to 7s package starts with Journey. This time you're dealing with a frog and the levels start with a T-shaped road along which you must move it. Using left, right, forward and back you navigate the map to various locations.

This is good for left and right skills and goes up to quite a difficult level with roads leaving the screen for other parts of the map. Unfortunately it commits the cardinal sin of mixing a downward, map, view of the roads, rivers, bridges and the frog, but a forward view of the buildings and trees.

Collect is a good game which involves making up sums from various signs and numbers. The progression through levels here is well thought out, exercising the same skill in slightly more complex ways each





Build a house in Actions

time, so you could leave children at it knowing they were not going to flounder at a given point.

At the Toyshop you are invited first to choose toys of a given price, then choose combinations of toys to make a given total first in pounds and then in pounds and pence. All the animation is nice and this is a good reinforcement game for addition.

The unfortunate thing it does is to automatically move up through the levels, each of which is quite a conceptual leap, so children might suddenly find themselves out of their depth when what they really needed was more practice at a lower level – just because children get something right once doesn't mean they've learnt it.

Comparing the Toyshop game with Electricity you'll wonder just who decided which games went at which age levels. You are presented with a circuit with a battery and light or bell and need to make it work by connecting the device to the battery with conducting materials and closed switches.

When I played it there was never any doubt as to the arrangement of the circuit, no possibilities of a short, for instance, or any opportunity to use the properties of insulators. Basically you go round replacing anything that's wood, plastic or glass with one of the other options. This is difficult to understand, the icons used are confusing, and it teaches nothing. This sort of exercise can only be done meaningfully with real equipment.

Funfax is a really nice introduction to data searching. It works on a Teletext system where pages are numbered. Subjects covered include animals, dinosaurs, transport among others. The format gives simple browsing through clearly defined routes but you can also have a question displayed at the base of the screen while searching through the database until you find the answer.

The last program is a fairly straightforward telling the time game. It works quite nicely with hours, half hours and quarters but suffers a bit from the clock graphic which makes the hour hand look as long as the minute hand. It certainly has the jolliest graphic reward of the whole package.

5 to 7s is not as consistent as the first package but there's enough there to make it worth the money.

The Over 7s pack starts with a fairly predictable word search program. There's a rather limited list of words available but it's a fair implementation and should keep children interested as they work their way through it.

The next program is Robot Draw. This is an implementation of the Logo language but it really is fraught with problems. Commands have to be selected from a menu, so selecting Forward then brings up a dialogue box into which you type your number. This box temporarily obscures part of the drawing screen. So entering commands is slow and there's no way of seeing what you have entered.

The editor for procedures is nice as it draws the shape step by step. But it has no means of moving up through the commands so editing is clumsy. As an introduction to Logo it's not bad, but children who have used other forms of the language at school will probably find it frustrating, especially its lack of a repeat command.

Planet Maths is a mental arithmetic game with sums floating across the screen. You have to type in the answer before it reaches the force field. You can select which operations are used but at top levels the child might have to deal with 15 times 15 in a matter of seconds so the levels do go up too high. Yet it's more useful practice.

A real treasure

Treasure has you moving the mouse around a desk, school or island map to find the booty. The instructions for your journey are listed and you drag out a line on the screen to the distance and direction indicated. Once you have followed all the instructions the robot digs in the ground and finds the treasure.

While this is rather dull, the options let you set practice in compass points or bearings with varying degrees of help, so it could be used to supplement other classroom work. The mouse skills required to get the exact distance are quite high – a very steady hand is needed.

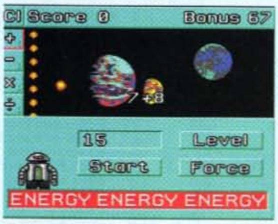
The Database provided on the disc is fairly easy to use, but offers few of the facilities that children will have found on programs at school. For instance, it is unable to produce graphs, it only searches the title field and has no numeric search facility. It is, however, ideal for storing names and addresses and the sample files provided point up some interesting uses.

Sentences is the last game on the disc. It gives you a sentence with various kinds of errors in it; you identify the errors and type in the correction. The error types are to do with spelling, punctuation and grammar and are presented on four levels. They are well chosen common mistakes, though the rationale behind the levels isn't clear.

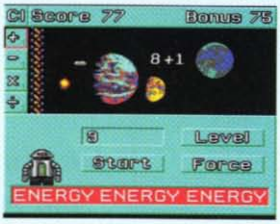
The programs in these packages are mostly about reinforcement, some of the claims in the manuals go a bit far but, that's not unusual. The manuals do provide a wealth of ideas for parents to follow up the work done on the screen.

Summing up

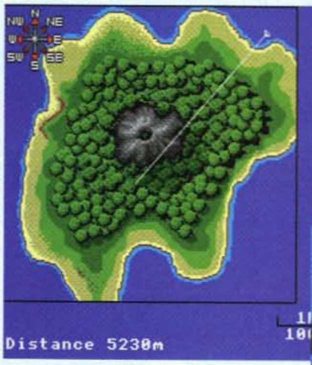
Overall these packages are useful in the home. The first will probably have a place in the infant school but the rest are not really targeted specifically enough to be of a lot of use to teachers. Having said that, they represent very good value for the price and even if you only found a couple of useful programs in each they would be a worthwhile purchase.



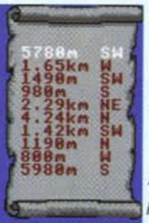
Zap the energy screen...



...but it gets too hard, eventually

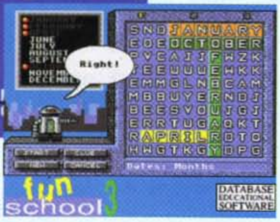


```
Distance 5230m
```

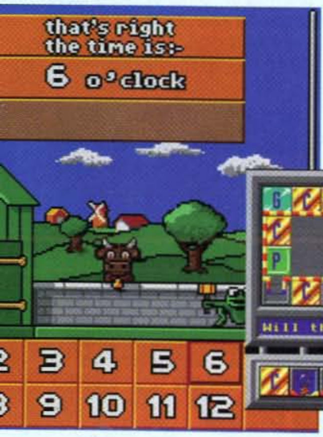


```
5780m   SW
1.65km  W
1490m   SW
980m    S
2.29km  NE
4.24km  N
1.42km  SW
1190m   N
800m    W
5980m   S
```

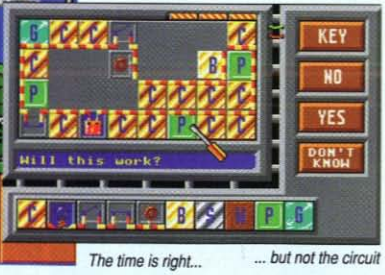
The search is on



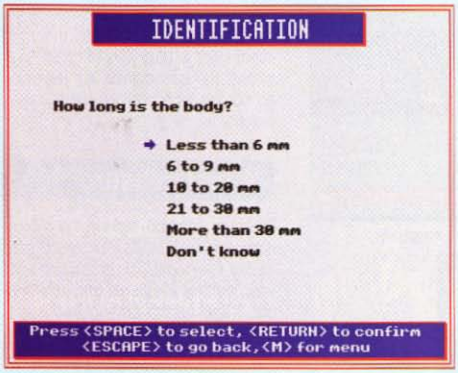
Searching for words



The time is right...



... but not the circuit



```
IDENTIFICATION

How long is the body?

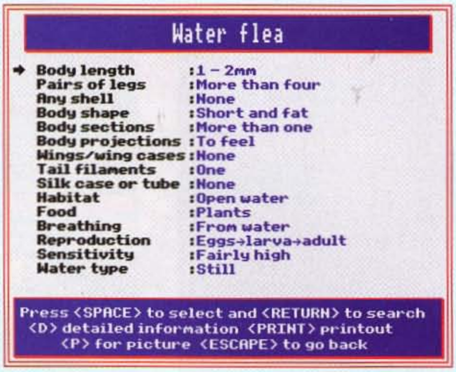
        → Less than 6 mm
          6 to 9 mm
          10 to 20 mm
          21 to 30 mm
          More than 30 mm
          Don't know

Press <SPACE> to select, <RETURN> to confirm
   <ESCAPE> to go back, <M> for menu
```

Finding out what it is

Donning wellies and notebook, Rog Frost investigates some pond life

Loads of information is available



```
                 Water flea

→ Body length          :1 – 2mm
  Pairs of legs        :More than four
  Any shell            :None
  Body shape           :Short and fat
  Body sections        :More than one
  Body projections     :To feel
  Wings/wing cases     :None
  Tail filaments       :One
  Silk case or tube    :None
  Habitat              :Open water
  Food                 :Plants
  Breathing            :From water
  Reproduction         :Eggs→larva→adult
  Sensitivity          :Fairly high
  Water type           :Still

Press <SPACE> to select and <RETURN> to search
 <D> detailed information  <PRINT> printout
    <P> for picture  <ESCAPE> to go back
```

A watery experience

Product: Pond Life
Price: £28.95
Supplier: Mercury Educational Products, 8-10 Lower James Street, London W1R 3PL.
Tel: 071-287 5060
Requirements: Risc OS

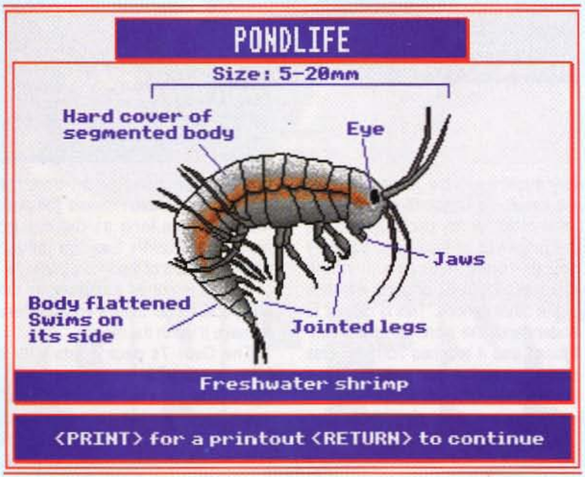
THESE days, a lot of educational software is described as content free. This is often a first-rate idea – particularly for the publishers – since a good program can be used across the curriculum. Pond Life Archimedes does not fall into this category.

By its very name you can tell it has content – it is about ponds – and it fits firmly in the school science area. There is an earlier 8-bit BBC Micro version and this one shows signs of its lineage. Once it's loaded you can forget about multi-tasking and the mouse. Pond Life is rooted in the arrow keys and Return-pressing era. While the program is totally manageable, it is a shame that the standard Archimedes environment is not used.

Pond monsters

You are presented with a four option menu. The first is Identification. Assuming you have found a little beastie in a pond, you are led through a series of questions about its size, shape and features and, hopefully, the computer can tell you what it is. Some 44 creatures are covered, ranging from the midge larva and the mite to the freshwater limpet and the pond snail. While not totally comprehensive, it is a pretty good list.

I particularly like the fuzzy nature of the searching. It is quite acceptable to answer *I don't know* to questions like *How many tail filaments?* If a question like that fills you with horror there is little need to worry. The help facilities are very comprehensive.



```
PONDLIFE
Size: 5-20mm
```

Hard cover of segmented body
Eye
Jaws
Body flattened Swims on its side
Jointed legs

```
Freshwater shrimp

<PRINT> for a printout <RETURN> to continue
```

Program sprites are easily grabbed

Having identified the creature, a full colour graphic is shown of superb quality. The features can be highlighted on screen or a full description can be accessed. If you've loaded a suitable printer driver beforehand, any screen can be printed by tapping the Print key. Obviously, colour is best.

Menu item two covers interrogation. Here, you select one of the 44 creatures by name and a page of data opens. There are 15 pieces of information about each beast – habitat, size, number of legs and so on. This page, like all others, can be printed.

A field can then be selected to find animals similar to your original choice. Or a more detailed set of information can be obtained with additional fields. It's possible to construct quite complex search requirements using the interrogation mode.

Option three is concerned with modelling a pond or a stream. First the sizes are entered and then a cross section of the stretch of water can be drawn and the depth indicated.

Next, plants are added and a mix of carnivorous and plant-eating animals are put in the water. These can be selected from a very long list, but only 10 types of animal are allowed.

Then the simulation is run. This always seems to involve a huge increase in the plants and a reduction in the numbers of animals. Sadly, no time scale is given so it is not possible to know how long it takes before equilibrium is reached. Those who like tinkering with the balance of nature can always halt the simulation and alter the type or quantity of animals in the water. Alternatively, with just a small amount of patience, events start to occur.

Poison leaves

These are a mix of accidental happenings such as leaking slurry tanks and others of a more deliberate nature such as fisherman cutting out half the weed. The effects on the pond are usually dramatic. Plant life fails, causing loss of oxygen, followed by herbivore and carnivore deaths.

One of the events involves planting willow trees around the pond. This has the most dramatic effect, causing total pond death. No explanation is given for this, and with no time scale users can only speculate. Two theories I have heard youngsters put forward are that the trees stop light reaching the pond, or falling leaves poison the water. It actually makes for good education, but I would have liked a bit more information.

Summing up

Pond Life is a very worthwhile program. It involves you in a number of key National Curriculum areas, connected with science and information technology. Also, teachers and pupils will love the easy access to the superb sprites. These can be incorporated into any DTP pack to enhance worksheets or other presentations. All in all, Pond Life is an essential resource.

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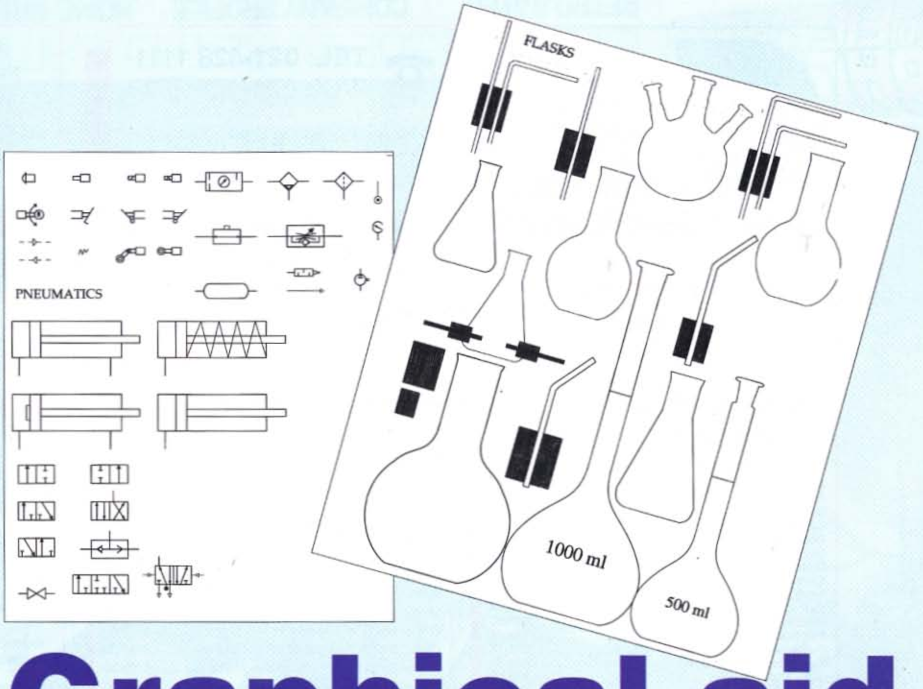

Graphical aid

Steve Bruntlett investigates the work of the SSERC Graphics Library

Product: The SSERC Graphics
Price: £30
Supplier: SSERC, 24 Bernard Terrace, Edinburgh EH8 9NX.
Tel: 031-668 4421
Requirements: Risc OS

THE SSERC (Scottish Schools Equipment Research Centre) was set up in 1965 to provide advice, consultancy and training on science and technology education and facilities.

The aspect of SSERC which is most relevant to readers of *The Micro User* is their development of Information Technology in science and technology education, paying special regard to the use of computer aided graphic design in scientific or technical writing and production.

To this end the SSERC have produced a Graphics Library. Although the package of three discs is aimed at science and technology education, there are programs and elements of graphic design work which may have uses for other spheres of CAD activity.

Two extra screen modes are provided: !BigScreen is an overscanning mode which allows you to use the full monitor area, while !MaxScreen is a wider version enabling you to have half as much screen space again – similar to Mode 66 in Impression.

Pix and programs

There is a long section of hints and tips, details of setting up and working practices in the accompanying 24 page A4 booklet and A3 flowcharts to show the contents of each disc, which are especially valuable as the discs contain well over 400 drawfiles, plus the extra utilities and programs.

The Maths programs are used to draw graphs and the Gears programs to draw your own gears. There are utilities to convert from DTP to First Word Plus+, as well as a Rescue program to rescue deleted text files which haven't been overwritten, a ReFormat program with soft defects and most useful of all to Draw or DrawPlus users, PathLink.

If you produce circles and ellipses in Draw these are closed paths and although you can group them to move or scale them you can't use colour fills on the unit as a whole.

PathLink combines all paths in a drawing into a single path which can then be treated as a single graphic object within the restrictions of the order in which paths have been drawn and the moves employed in the process of the drawing.

There are sections on how to use the drawfiles on the three discs, with detailed advice on how to set up your computer and settings for Draw. For example the Alphaboards, Computing and Electronics graphics will be displayed life-size on screen with an A3 setting and a Zoom setting of 2:3.

Pneumatics graphics are produced so that they line up accurately with a one millimetre grid setting. There are comprehensive notes on Isometric drawing including details of how to produce isometric views of small components.

Washers and threads

The program Washr+Tube produces washers and pipes. Cylinders produces cylinders and threads. Threads draws lengths of threaded rod.

This is extremely useful, you can draw exactly what you want rather than having to make do with an unsatisfactory modification of an existing drawing. The documentation is worth getting hold of purely for its advice.

The second part of the booklet shows all the drawings for each directory of the discs in turn. The amount of work that must have gone into the production of this must have been enormous. Some of them are extremely detailed and all can be used easily even when combining multiple drawings for a worksheet or illustration.

They are all drawn from the bottom left hand corner of the Draw window so that when dropped on to a master they're not off the edges of the drawing where you can't find them. This also means that you can see them in the default draw window when they're first loaded.

It took me a long time to look through the drawings and even longer to produce masters that showed some of the components for each section. I produced some of these by dropping the entire contents of a directory into DrawPlus and spreading out the drawings. In practice you can see what they look like from the reference sheets and load in exactly what you need for a particular arrangement of components – !Glimpse would be useful too.

Summing up

These discs have uses for anyone involved in Science or Technology education. But they also hold useful items for anyone involved in graphic design, with some of the drawings excellent examples of how to use Draw well.

The utilities are certainly worth getting hold of. Anyone involved in producing work sheets or technical diagrams for science or technology would find these discs extremely useful.

Disc Breakdown

Disc 1 Basic laboratory items, beakers, flasks, glass equipment such as tubes and funnels, general chemistry lab equipment, hazard symbols, interfaces and sensors.

Disc 2 Boards for electronics, computing equipment, connectors, electronics equipment, components and symbols, the set of utilities mentioned at the start of the review and a rather fine set of shaded spheres and globes.

Disc 3 Biology equipment and components, gears, isometric drawings and programs, maths programs, meters, physics and pneumatics equipment, components and symbols, a series of shaded 3D shapes and a set of basic tools.

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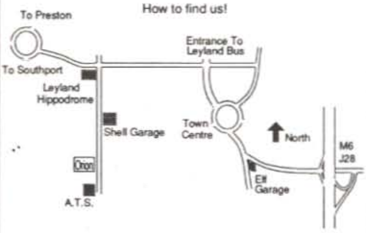

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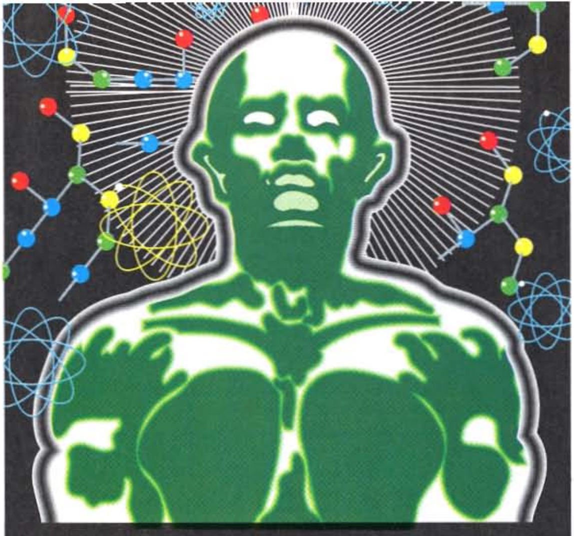

The Beeb Body Building Course

Some more sound advice

Mike Cook explains how to grab samples on the Arc

LAST month we looked at how to drive our Sound Sampler from Acorn's 8 bit machines. This month it's time to see how we can drive this from the 32 bit Acorn machines.

An application to acquire samples and play them was on the December subscription disc but no description of how this worked was given. Well it's now time to correct this.

As you remember the Sound Sampler is connected to the printer port, so the first thing we need to know is the address of this port. On the 8 bit machines this is easy as the printer is at address &FE61: Writing to this address will change the bit pattern on the output signals going to the printer. Unfortunately with the 32 bit system it's not so easy.

Address unknown

You see Acorn don't want anyone writing directly to this output and so don't publish the full range of addresses. There are solid reasons for this: If all your input and output goes through the operating system it's easy to patch in alternative printer drivers like a SCSI laser printer.

Also the software should work on many different types of hardware, the hardware changes being taken care of by the operating system.

This is all well and good, apart from two cases: First when you want to use the output for something that was not planned. Second when you want the speed that direct access can give. Both these factors are true in this month's case.

So what we have to do is to resort to the circuit diagram of the computer to find the address we want. However, it's still not as simple as that.

The printer port is part of the VL86C410 RISC I/O controller chip and this appears in four different places in the memory map. Each different address is accessed at a different speed and signal protocol, rather in the same way that the Model B had its inputs and outputs accessed at 1MHz while the processor ran faster.

These four speeds are sync access, fast access, medium access and slow access. So the address you use depends on the type of input/output device you have. To be on the safe side we will use the slow access.

This is because we need to keep the signals to the A/D converter stable for a minimum time. By using the slow access we can make these pulses last long enough irrespective of what processor is in the computer or the speed it is running.

The hexadecimal address of the base of the IOC in slow mode is &3250000. If we want the printer port this is offset by &10 from this address so we actually need to access &3250010.

Busy line

If we read this address we get the handshaking input "busy" in bit zero. However, if we want to write a bit pattern to this address the bit pattern must be in the top 16 bits.

For example to make all the printer outputs go high (a hex value of &FF) we must store the number &00FF0000 at address &3250010.

There is one final complication: The operating system combined with the hardware will not allow you to access this memory location. If you attempt to you will get an *access violation* error message.

Obviously the operating system itself must be able to access the printer, so how is it done? Well the ARM chip can run in four different modes: Supervisor, IRQ (Interrupt Request), FIQ (Fast Interrupt Request) and User.

All our programs run in User mode and the hardware prevents access to the input/output chips in this mode. So what we have to do is to trick the computer into running our code in the supervisor mode.

There are a number of vectors used by the operating system to allow the standard routines to be modified and replaced. One of these is the *Unknown SWI* vector. A SWI (pronounced swy) is a SoftWare Interrupt and is the way that operating system calls are invoked. So what we need to do is to temporally hijack this vector and send it into our own code.

When this happens the code is executed in supervisor mode thus allowing us to get at the addresses we want. Phew, it's a lot simpler on the less powerful machines isn't it? Armed with this information we can set to and write our sampler software. The test software is shown in the listing.

This will simply take a 32 bit sample and plot a compressed view of the waveform on the screen. When it is run there are only two commands – the spacebar or S. Pressing the spacebar will take the sample and then plot it on the screen whereas the S key will save the sample in a file called SAMP. It will also converts its file type to EDO which is the type used by the public domain program !DSEdit.

Strip for action

With this you can play the sample and generally mess about with it. This program is basically the heart of the sample application with all the Desktop Risc OS stuff stripped away so you can see what is happening.

The size of the sample is set up in line 50 and this memory is plotted out in lines 21 to 290. The sample procedure starting at line 310 passes the address of the sample buffer and the size of it, to the machine code by the use of the variables *G%* and *H%*.

When calling any machine code the initial values of the processor's registers are set up by the single letter integer variables with *A%* setting R0 and *B%* setting R1 and so on.

You can see that I have used registers R6 and R7 to pass these values. The machine code is assembled in lines 380 to 1250. The first thing we do is to claim the unknown SWI vector and set it to point at our code starting at line 550. The actual call to this routine comes in line 480 – this causes lines 550 onwards to be called as a kind of subroutine, returning at line 490 when the sample has been taken. Lines 490 to 530 then release the unknown SWI vector and return to Basic.

The interesting code starts at line 550. The first thing to do is to disable all the interrupts. If this is not done interrupts like the real time clock will

➤

```
   10 REM > <BasicSave$Dir>.SampleS
   20 REM (c) Mike Cook
   30 MODE 0
   40 DIM CODE% &100
   50 SBUFS=&8000 : REM 32K Sound buffer
   60 DIM SBUF SBUFS
   70 PROC_CSU
   80 PRINT"Testing the Sampler"
   90 PRINT SBUFS/1024;" K Buffer ";
  100 PRINT" at 12KHZ"
  110 REPEAT
  120 PRINT"PRESS SPACE TO SAMPLE OR S TO SAVE"
  130 A$=GET$
  140 CASE A$ OF
  150 WHEN " ": PROC_SAMPLE:T=TIME:PROC_
SHOW
  160 WHEN "S": OSCLI("SAVE SAMP "+STR$~SBUF+"
"+STR$~(SBUF+SBUFS)):OSCLI("SETTYPE SAMP ED0")
  170 ENDCASE
  180 UNTIL FALSE
  190 END
  200
  210 DEF PROC_SHOW
  220 CLS
  230 MOVE 0,?SBUF*4
  240 X%=0
  250 FOR A%=SBUF TO SBUF+SBUFS STEP (SBUFS/640)
  260 DRAW X%,?A%*4
  270 X%+=2
  280 NEXT
  290 ENDPROC
  300
  310 DEF PROC_SAMPLE
  320 G%=SBUF:H%=SBUFS
  340 CALL SAMP
  360 ENDPROC
  370
  380 DEF PROC_CSU :REM CODE SETUP
  390 FOR A=0 TO 2 STEP 2
  400 P%=CODE%
  410 [
  420 OPT A
  430 .SAMP
  440 MOV R0,#&18 \ UNUSED VECTOR NUMBER
  450 ADR R1,GS \ ROUTINE TO CALL ON UNKNOWN SWI
  460 MOV R2,#0 \ NUMBER TO PASS TO CALLING ROU-
TINE
  470 SWI "OS_Claim" \ CLAIM VECTOR
  480 SWI &80101 \ UNUSED VECTOR TO CALL READ IN
ROUTINE
  490 MOV R2,#0
  500 MOV R0,#&18 \ VECTOR NUMBER
  510 ADR R1,GS
  520 SWI &20 \ RELEASE VECTOR
  530 MOV R15,R14 \ BACK TO BASIC
  540
  550 .GS \ GATHER SOUND
  560 TEQP R15,#&C000003 \ DISABLE INTERRUPTS
  570 MOV R0,#&3200000 \ BASE ADDRESS OF IOC
  580 ADD R1,R0,#&50000 \ BASE OF PRINTER LATCH
  590
  600 \ DELAY VALUES FOR 8MHz Clock
  610 \ 16B 5.5KHz sampling
  620 \ 10E 7.4KHz sampling
  630 \ 0B5 11KHz sampling
  640 \ 0A6 12KHz sampling
  650 \ 080 Maximum rate for a 310
  660
  670 MOV R2,#&00000 \ T1 VALUE HIGH
  680 STR R2,[R0,#&54] \ T1 LATCH HIGH
  690 MOV R2,#&A60000 \ T1 VALUE LOW
  700 STR R2,[R0,#&50] \ T1 LATCH LOW
  710
  720 LDR R2,[R0,#&18] \ GET IRQ MASK
  730 ORR R2,R2,#&40 \ ENABLE T1
  740 MOV  R2,R2,LSL #16
  750 STR R2,[R0,#&18] \ MASK REG
  760
  770 MOV R2,#&400000 \ CLEAR T1 INTERRUPT
```

Clocking the differences

With the wide range of 32 bit machines available along with a large number of third party upgrades it was not possible to test the sound sampler on all combinations of machines. In order to make the sampler work with a wide variety of ARM processors clocking at different rates the hardware timer in the I/O processor chip *IOC* was used.

However, there are some machines with an enhanced version of the video *VIDC* chip allowing some very fancy modes. Some of these modes involve clocking these chips at a different rate. As this rate also affects the timers in the chip the digitising rate could be affected, this results in a too fast playback. The solution in these cases is quite simple: Run your system in one of the standard modes like Mode 12.

```
  780 STR R2,[R0,#&14] \ IRQ CLEAR
  790 STR  R2,[R0,#&58] \ GO T1
  800
  810 .TLOOP \ DELAY LOOP FOR TIMER T1
  820 LDRB R2,[R0,#&10]
  830 TST R2,#&40
  840 BEQ TLOOP
  850 MOV R2,#&400000 \ CLEAR T1 INTERRUPT
  860 STR R2,[R0,#&14] \ IRQ CLEAR
  870
  880 \ TAKE ONE SAMPLE
  890 MOV R2,#0 \ CHIP SELECT LOW
  900 STR R2,[R1,#&10]
  910 MOV R3,#&A \ BITS TO READ IN
  920 MOV R5,#0 \ COLLECT BITS HERE
  930 .LOOP1
  940 LDR R4,[R0,#&10] \ GET DATA
  950 MOV R2,#&10000 \ CLOCK HIGH
  960 STR R2,[R1,#&10] \ PUT OUT TO PRINTER
  970 AND R4,R4,#1 \ MASK DATA BIT
  980 MOV R5,R5,LSL #1 \ PREPARE R5 TO RECIEVE IT
  990 ORR R5,R5,R4 \ MIX IT IN WITH R5
 1000 MOV R2,#0 \ CLOCK LOW
 1010 STR R2,[R1,#&10]
 1020 STR R2,[R1,#&10]
 1030 SUBS R3,R3,#1
 1040 BNE LOOP1
 1050 MOV R2,#&20000 \ CHIP SELECT HIGH
 1060 STR R2,[R1,#&10]
 1070 AND R5,R5,#&FF \ MASK OFF START BI
T
 1080 EOR R5,R5,#&FF \ TURN RIGHT WAY UP
 1090 \R5 NOW HAS SAMPLE
 1100 STRB R5,[R6],#1 \ PUT IT IN THE BU
FFER
 1110 SUBS R7,R7,#1  \ DECREMENT BYTES T
0 GO
 1120 BNE  TLOOP \ BACK UNTIL ALL DONE
 1130
 1140 \PREPARE TO EXIT
 1150 MOV R2,#&400000 \ CLEAR T1 INTERRUPT
 1160 STR R2,[R0,#&14] \ IRQ CLEAR
 1170 LDR R2,[R0,#&18] \ GET IRQ MASK
 1180 AND R2,R2,#&BF \ ENABLE T1
 1190 MOV  R2,R2,LSL #16
 1200 STR R2,[R0,#&18] \ MASK REG
 1210
 1220 LDMFD R13!, {PC} \ BACK FROM WHENCE YOU
CAME
 1230 ]
 1240 NEXT
 1250 ENDPROC
```

TAKE IT EASY

If you would like to save the wear and tear on your fingers you'll find this listing – together with all the others from this issue – on this month's disc, sent free if you subscribe to *The Micro User*

➤

cause the samples to be taken at irregular intervals and so cause severe distortion. Interrupts still occur for the screen refresh but these can't be stopped as they also refresh the dynamic ram. Fortunately they cause little distortion.

The ARM instruction set can only load into registers bit patterns composed of 8 shifted bits. Therefore we need two instructions to get the base address of the IOC into register R1, lines 570 and 580. Next we set up the timers that determine the sampling rate: This 16 bit value needs to be loaded in two 8 bit goes.

Remember these are also shifted by 16 bits so the values used, in lines 670 and 690, correspond to 12KHz sampling. There are comment lines giving other sampling rates. Having enabled the timers and set them going (lines 720 to 790) we then wait for the time out to happen and then set it going again, lines 810 to 860.

The next block of code lines 880 to 1050 generate the timing sequence needed for the D/A converter shown in the December article. Basically it waggles the chip select and clock lines up and down and collects the data one bit at a time on the "busy" signal pin.

Having acquired the sample it is placed in the buffer and if it is not full yet we go and get another sample, lines 1060 to 1120.

The final piece of code, lines 1140 to 1220, tidy things up by disabling the timer, enabling the interrupts and returning.

I hoped you followed that, and found the glimpse into the forbidden world of directly accessing the hardware informative. If you would like further information then I recommend you look at the ARM Data Manual published by Prentice Hall, ISBN 0-13-781618-9.

It contains the data sheets of all the ARM family of chips, coupled with a diagram of how they are put together. It can provide you with many happy hours of hardware hacking. Which is just what I am going to do now – you can see what I come up with next month.

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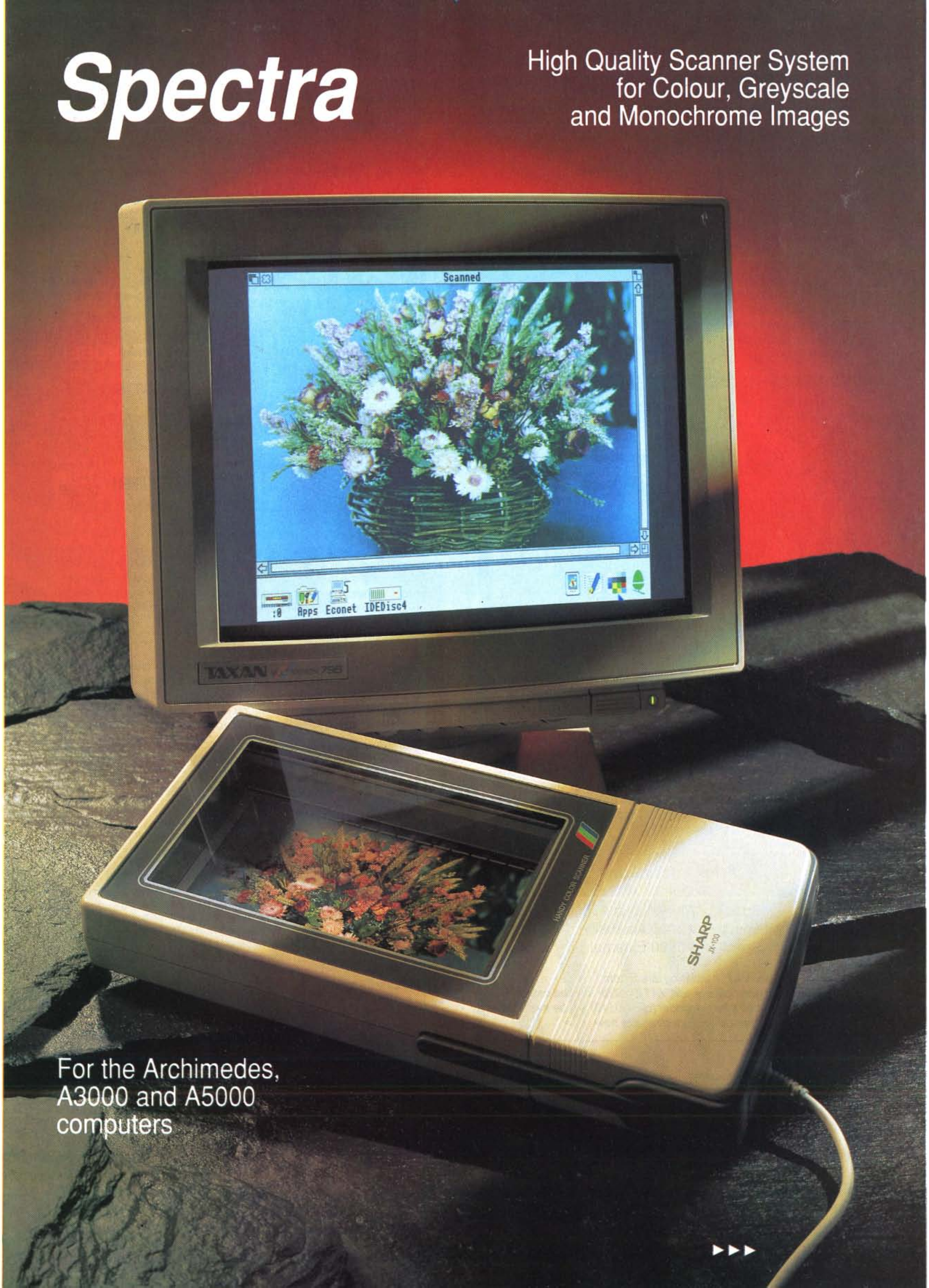
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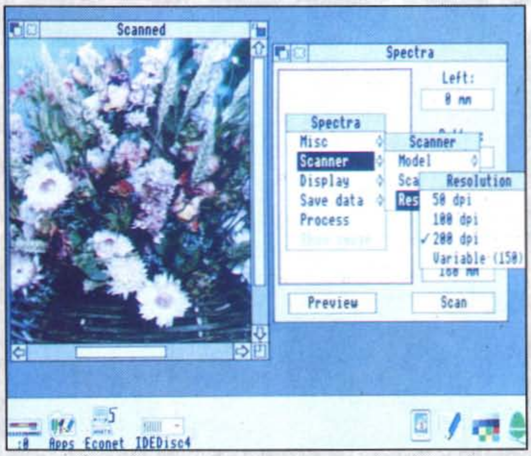

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All prices exclude VAT. If ordering direct from RISC Developments, please add VAT & £9 for insured carrier delivery. The A3000 internal model (code 0119) will be available early 1992, the other models are available now.

RISC Ltd developments

117 Hatfield Road
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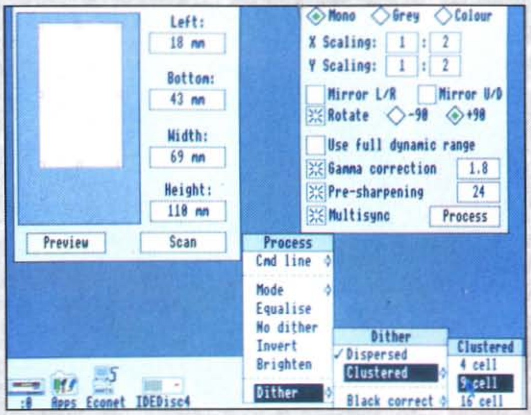
Left: 18 mm
Bottom: 43 mm
Width: 69 mm
Height: 110 mm
● Mono ○ Grey ○ Colour
X Scaling: 1 : 2
Y Scaling: 1 : 2
☐ Mirror L/R ☐ Mirror U/D
☒ Rotate ○ -90 ● +90
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To avoid the annoying wait associated with some colour scanners, *Spectra* is fully multi-tasking throughout the scanning process. As data is read, it is stored directly to disc, or buffered through memory, the buffer size being fully configurable. In either case, the effect on other applications' performance is hardly noticeable.

Whilst the Spectra range can be used with any RISC OS system, a minimum of 2Mbytes of RAM and a hard disc drive is recommended to make full use of the features.

Technical Specification

Scanner:	*Sharp JX100*
Interface:	*RS232 Serial, 115200 baud*
Interface card:	*Half-width, high speed serial card*
Scanning system:	*Motorised scanning head*
Scanning method:	*Reflective CCD sensor*
Illumination:	*Calibrated white-light fluorescent lamps*
Scanning modes:	*Monochrome, 256 grey scales & full colour (16 million levels)*
Scanning area:	*100mm by 160mm (maximum)*
Resolution:	*50-400 dots per inch (201-400 dpi are simulated)*
Software:	*Low-level driver code in EPROM on interface card, RISC OS compliant application, supplied on disc*
Scanning time: (at 18°C)	*40 seconds (Monochrome preview)* *6 minutes (Full colour, 3 passes at 100 dpi)*
Documentation:	*48 page A5 user guide - wire bound*
Contents:	*Scanner, interface card, power supply, user guide, application disc, dust cover*

RISC Developments reserves the right to change the specification without prior notice.

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Spectra A3000 Internal .... @ ....
Spectra A3000 External .... @ ....
I enclose a cheque for £.................................... or please debit my Access/Visa
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A new era begins!

Next month we enter our tenth sparkling year with a stunning new issue where we'll be revealing details of a fabulous competition for all readers.

But that's not all. The new Micro User year will see the beginning of a brand new series of special software offers with original packages for both the 8 bit BBC MIcro and the advanced 32 bit machines.

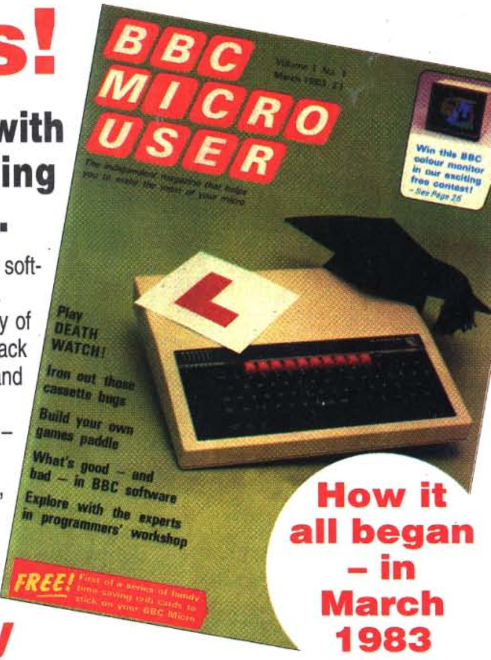
We'll also be publishing a unique series of software entertainment packages called the History of Micro User Games. As a start, we'll cover the major games from the first year of *The Micro User* back in 1983. These historic, pioneering games have been specially converted for the BBC Master and Archimedes machines – so no one need miss out.

Within the pages of the magazine itself there will be changes to the format of Software Scene – renamed ScreenPlay – introducing an exciting new games writer.

All the regulars will still be there: Your Letters, Problem Solved, the PD page, Body Building, reviews of the best software on offer and the comprehensive Education section.

● ***From beginners to professionals* The Micro User *has everything you need to use your 8 bit BBC Micro or 32 bit Archimedes machines in new and innovative ways.***

Make sure you get YOUR copy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Explore with the experts in programmers' workshop
FREE! First of a series of handy time-saving crib cards to stick on your BBC Micro

How it all began – in March 1983

What our readers say

...I would like to congratulate the publishers of RISC User for producing an excellent journal, the presentation of which is neat and stylish and the content lively and informative...I think that now you have achieved a good balance between articles for the novice and advanced user...
K. Gomm

...I find your magazine to be the best available for the Archimedes range of computers, and I am sure I have obtained far more information about the workings of these machines than all the others I read.
D.A.Symes

...I must commend you on your most excellent publication that keeps my interest at all times.
N. Dennigan

...RISC User provides additional information not frequently covered in less specialised magazines.
M.Rozdoba

...I find the Technical Queries and Hints & Tips extremely useful - they have helped me unravel many a problem. Keep up the good work!
P.J.Matthew

...Congratulations on your articles for beginners, we could certainly do with more of them.
J.H.Luxton

...I wish to congratulate you for the continued excellence and highly interesting nature of your magazine, and sincerely hope that you will be able to maintain these standards for a long time to come.
S.J.Hasleton

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the most popular subscription magazine devoted to the Archimedes, A3000 and A5000 computers

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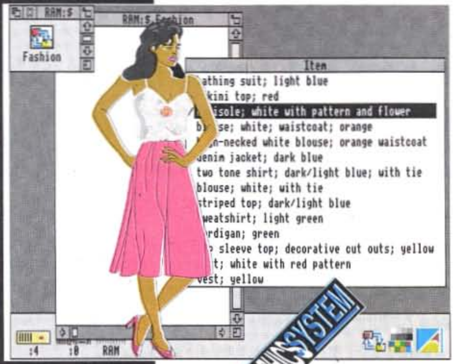
The smArt Suite

All 4Mation packages for the Archimedes carry a FREE SITE LICENCE.

SmArt is a Linked Graphics System. When picture files are loaded into smArt, different parts of the picture can be changed by making selections from a menu. The graphics components are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ$ 198) smArt discs £16 (NZ$ 59)


RAM:$
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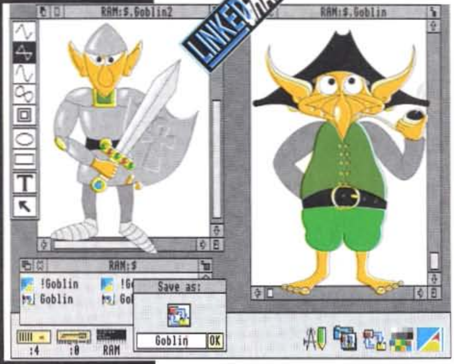
denim jacket; dark blue
two tone shirt; dark/light blue; with tie
blouse; white; with tie
striped top; dark/light blue
weatshirt; light green
rdigan; green
sleeve top; decorative cut outs; yellow
t; white with red pattern
vest; yellow
:4 :0 RAM
LINKED GRAPHICS SYSTEM


RAM:$.Goblin2
RAM:$.Goblin
RAM:$
!Goblin
Goblin
Save as:
Goblin
OK
:4 :0 RAM

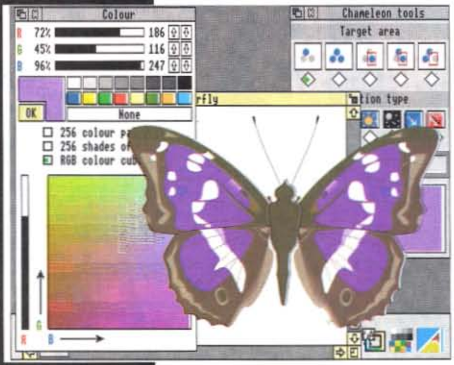
For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ$ 129)

Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to Draw files. As well as palettes for 16 and 256 colour modes, there are options for 256 shades of grey and a RGB colour cube which provides thousands of colours. Colours may be selected from other Draw files so can be copied from one picture to another. Colours may also be changed in HSV values; Hue, Saturation and Value. Edited files may be saved as normal Draw files or as colour separations. A clever Undo and Redo facility allows virtually any number of colour changes to be cancelled and then reinstated. Zoom and Magnification facilities allow accurate editing of small areas.

Chameleon £25 (NZ$ 95)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G 45% 116
B 96% 247
OK
None
☐ 256 colour p
☐ 256 shades of
☒ RGB colour cub
Chameleon tools
Target area
rfly
tion type
R
G
B

FREE DEMO DISC

Send us a blank disc to receive a demo copy of smArt and Chameleon. Only the save facility is missing. Poster demo also available.

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Snippet	£29	NZ$120.00
Jigsaw	£29	NZ$120.00
Jiglet	£29	NZ$120.00
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Q-Master

... pools of fun

Price: £14.95 (5.25in disc) 15.95 (3.5in disc)
Supplier: The Fourth Dimension, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 769950
Requirements: BBC B, B+, Master, Compact

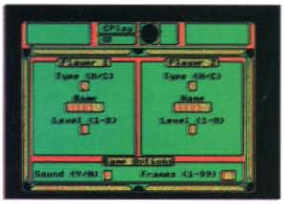
JUST when you thought the 8 bit games market for Acorn machines was lifeless, apart from the occasional kicking from Sam, back into the fray come Fourth Dimension with a completely new game, Pool.

Supplied in the usual video-style box Q-Master comes on a single disc and a short (slightly inaccurate) eight-page manual. Press Shift+Break to run and away you go: From the title screen you press 1 if you want to play immediately or 2 for the options screen.

In play mode you are presented with a slightly reduced size Mode 1 screen using four colours. This works extremely well and the only oddity is the white ball, which is black. But this is distinguished from the black 8-ball because this has an 8 on it – easy. For each match you must also set sound on and off, and the number of games. This can be anything from 1 to 99 but must be odd – other wise a draw could result.

You can play against the computer, against another human player or have a computer versus computer match. The machine players can have a skill rating from 1 to 8 although I didn't perceive a lot of difference in the playing technique – it seemed to just alter accuracy rather than cleverness.

On the whole the computer played like a typical Pool player, leaving balls over pockets even if they would be easy pots. On the other hand it did seem to have a strong bias in favour of trying to double or triple balls into pockets – usually meeting with failure.



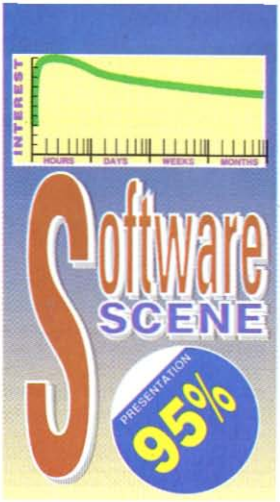
Game setup

Actually cueing the ball was simple enough – a direction cross appears which you can move around. This is used to show the line of the ball when you hit it. Pressing Return takes you to the second stage which allows you to control the spin: A representation of where the cue will strike the ball is shown in the middle of the screen.

You can also alter cueing angle in order to get some backspin on a ball that's well in towards the cushion. The accuracy of the simulation is represented by the way the ball moves if you provide a lot of backspin but insufficient power to reach the target ball: The white will stop and then move backwards.

At any time you can adjust the power of the stroke and a second Return initiates your go. In practice mode you can also move the ball, or put all the balls back on the table.

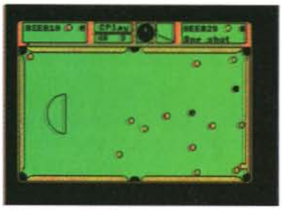
The first six choices on the option screen allow you to load and save games, the high speed (clear the table) scores and the highest break table. Options seven and eight let you view the high speed and high break table while 11 and 12 let you make attempts at the high speed or break while option nine starts the match.



Option 10 takes you to the practice session while 13 takes you to a previous match or practice session. With option 15 you can redefine the keys although I found the default ones quite satisfactory. The sound can be switched on and off with option 14.

This is an excellent implementation and is fun to play. Well done.

Geoff Brown



The computer plays a mean game

Holed Out Compendium

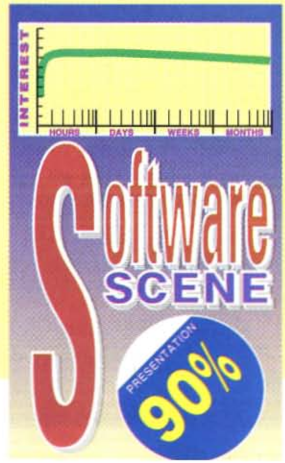
... key to enjoyment

Price: £24.95
Supplier: The Fourth Dimension, 1 Percy Street, Sheffield S3 8AU.
Tel: 0742 700661

IF you don't have Gordon Key's golf games – Holed Out, Holed Out Extra courses or Holed Out Designer – this could be the bargain of the year. In one box you can now get the whole lot on just two discs: The game, six courses and the designer.

The manual is a folded sheet of paper which doesn't compare well with the elaborate course maps and instructions which were available in the previous sets. However instructions are provided within the program.

Unlike many compendiums the front end has been re-written to unify the whole set. What you don't get, unfortunately, are the maps of each hole which can be invaluable when it comes to choosing the right club. Still, it's great fun and learning from experience is just as valid. Booting up disc one takes you to the first menu where you can choose between running the designer or playing the game. Taking the game option first you then choose a course and set up the players: Up to six in number with four levels of skill. Having selected the course you can opt to preview each of the holes, and view them from various angles. This can help you decide in advance how to play each one, but that's really for the serious player.



Play starts with the first person on the scorecard and you use the mouse to select the club you want to use. There are 14 available: Three woods, nine irons, a wedge and putter. Details of how far these tend to throw the ball is given in the manual.

Your next action is to choose the line of flight using onscreen crosshairs. This takes some getting use to and generates a little of the randomness that provides the challenge.

Finally come the power meters. Clicking the Menu button starts the power rising from 0 to 100 per cent. You click again at the amount you want, or use the keyboard to provide hook and slice. Play then proceeds round the players, the one furthest from the hole taking the next shot.

For fairway shots the view is always from behind the player towards the hole while shots on the green are shown from above. In general the holes are quite complex and include water, sand, trees and paths. However the greens are always circular with the hole itself in the middle, but they do slope by varying degrees.

Holed Out is a lot of fun and this collection is certainly value for money.

Pete Lambert

HOLED OUT II
4
4

The Adventure Gamer's Manual

...dungeon reference

THIS book on adventure games and their solution has been written by the alter-ego of our very own Mad Hatter and he shows his knowledge of their background and history by covering computers other than just his favourite Acorn machines. In truth most text adventure games are available on all formats anyway.

Though a generic book, most of the games available for the BBC and Archimedes are covered in depth in this comprehensive tutorial guide on how to get the most from adventures. The help is not in the form of complete solutions but rather in hints, tips and techniques which will help with all games past, present and future.

Being very fond of adventure games, but easily disillusioned, I was stunned by Bob's patience as, over the years, he must have had to work his way through hundreds of games on many different computers.

Tracing the history of adventures since the mainframe's Colossal Cave to the latest Topologika release, SpySnatcher, this book gives an interesting and detailed insight to progress and the increasing complexity and sophistication of computer adventure games – both text and graphic.

Though it does touch on arcade, role playing and strategy, the content concentrates on the more traditional text, illustrated and graphic adventures.

The book is written in such a way that it is easy to read, or to dip into as a reference with good use of headings and sub-sections.

Packed full of hints and tips on a mass of adventures, it encouraged me to dust off my old version of The Hobbit.

Everyone is always told to map adventures. If like me you can happily read a map but can't make a map successfully, this book is an absolute life saver. Bob introduces you to logical mapping and 10 golden rules of surviving adventure games with a vestige of sanity remaining to you.

Logical mapping is easy to do, simple to understand and gives much more information than arrows and squiggles on a piece of paper. He does give a photocopiable mapping sheet for the more geographically sound out there.

Mazes – simple, advanced, grammatical and evil – are covered in detail with specific examples to help, as well as the best saving strategy to use. Moving on to puzzles and problems, again specific adventures and general points are covered. Finishing with a list of recommended adventures on a host of formats, there is something here for everyone.

Follow the advice and strategies laid down here and not only will you appreciate the work done by Peter Killworth, the Austin and O'Leary brothers among others, but you'll be able to achieve better results and a feeling of self-congratulation.

Jo Giles

Price: £12.95
Supplier: Sigma/ Wiley, Baffins Lane, Chichester, West Sussex PO19 1UD.
Tel: 0243 775878
Requirements: All formats, all machines

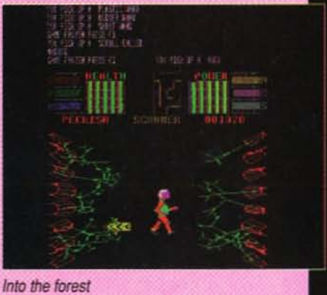
Explorer

Price: £25.99 (DFS disc only)
Supplier: Dragonsoft, PO Box 22, Whitchurch, Shropshire SY13 2ZZ.
Tel: 0948 840522
Requirements: BBC B, B+, Master

IT'S just like waiting for a bus, nothing for ages then two come at once... This is the second 8 bit game of the new season and, if nothing else, it's big.

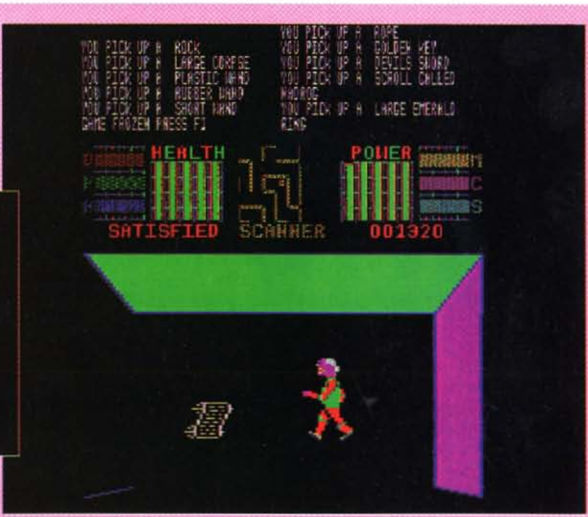
What you get is two discs, a 16 page manual and a rom – yes, the first of it's type since Doctor Who. The promotion claims 31 levels, and in each there's 31 by 31 rooms – about 29,000 areas in total. What you've got here is a graphical adventure with role-playing overtones. You play an explorer whose boasting has resulted in having to actually go and discover a place (or is it person?) called Hallar and vanquish the fiendish Vandar.

Having fitted the rom, insert the game disc and press Shift+Break to start. You are asked whether you have dual drives; it's better if you do since there's no disc swapping as the data disc goes in drive one.



Into the forest

The display is unusual. It has Mode 0 at the top occupying about a quarter of the screen: This is used for messages. In the middle is Mode 1 which contains various status information and a map of the local area. Finally, occupying just over half the screen, is a Mode 2 area which presents a view of the current room.



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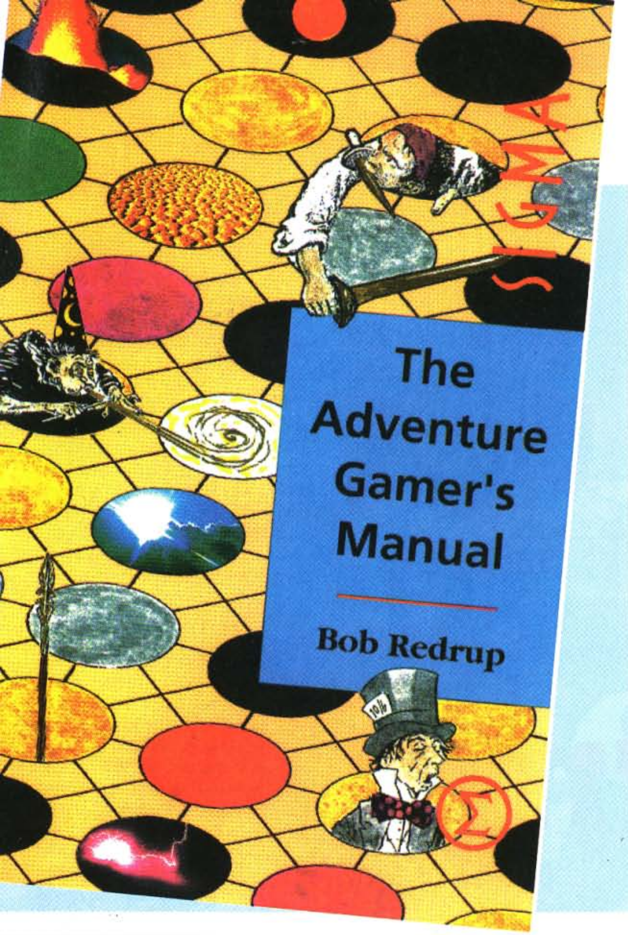
YOU PICK UP A  ROCK                 YOU PICK UP A  ROPE
YOU PICK UP A  LARGE CORPSE         YOU PICK UP A  GOLDEN KEY
YOU PICK UP A  PLASTIC WAND         YOU PICK UP A  DEVILS SWORD
YOU PICK UP A  RUBBER WAND          YOU PICK UP A  SCROLL CALLED
YOU PICK UP A  SHORT WAND           WADROG
GAME FROZEN PRESS F1                YOU PICK UP A  LARGE EMERALD
                                    RING
```

Grab that scroll

The room is drawn as if viewed from the top. However all the characters and sprites are shown side on. It's a bit strange but easy enough to get used to.

The role-playing games aspect comes in because both you and the other denizens have Health, Magic Power, Experience, Strength, Agility, Dexterity, Constitution, Skill, Speed and some others like resistance to unpleasant effects.

Unfortunately there's no way you can affect these at the start, so you can't trade points between characteristics to try to optimise your game



persona. The scanner in the middle shows only those rooms that you've been to.

The various statistics on either side show the state of your character. Underneath these is a statement of how hungry you are with the score on the right.

Movement is through the usual Z, X, : and / keys, while Return takes you to the command menu. This is subdivided into general controls – like drop and pickup – object manipulation and game controls for sound, speed of screen redraw, pause and so on.

Game play involves wandering around collecting objects, killing the various nasty creatures that appear – although other options to murder will apply to some beasts. It's essential to eat regularly if you can find the food.

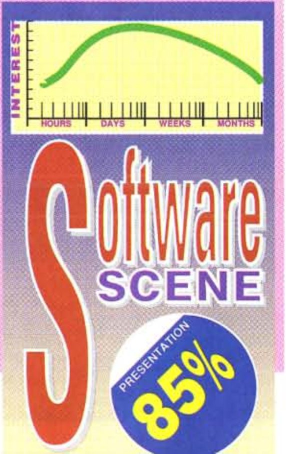
Objects to be found include potions, scrolls, rings, rope, magnets, armour and weapons. Many objects, like the armour, have obvious uses but what about the pet food? Well, that's the adventure. There are also fixed objects which are exits to other levels.

Like most so-called role-playing games on computers there's little, if any, actual playing of roles, but the use of statistics removes the one touch death typical of the average arcade adventure. There's the obligatory randomly-appearing wandering monsters but at least this program has the decency to make them fight among themselves.

This has the disadvantage that occasionally the whole game slows down to a snail's pace while some fight off-screen is being carried through.

There's so much in this I could only scratch the surface but it's a lot of fun.

Petra Galloway



Bubble Fair

...trouble with bubbles

Price: £19.95
Supplier: Eterna/Vector Services,
13 Denington Road,
Wellingborough, Northants
NN8 2RL.
Tel: 0933 279300

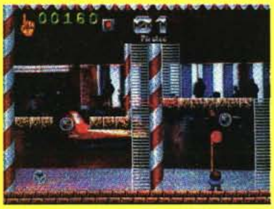
THE best way I can describe this game is a cross between the arcade game *Pang* and a platform game. Like Pang the idea of the game is to burst bubbles.

Each time a large bubble is burst it breaks into two smaller bubbles. Contained in some bubbles are tokens which when released will float to the ground where they can be collected to provide extra weapons, time, lives and so on.

Bubble Fair takes this idea a stage further by introducing platforms and ladders which you must walk and climb to reach the elusive bubbles. You'll also find that the object of each level is not to burst all the bubbles, but to collect the ice cream token which is contained in one of them.

This doesn't float to the ground but remains floating in the air. Initially you are armed with a yoyo, but later this can be replaced with a variety of weapons including missiles.

Touch a bubble and you'll find yourself imprisoned inside it and floating to the top of the screen. Here the bubble bursts and your little pal emits what sounds like a giggle of delight, just before plunging to his death. Very strange!



Use that yoyo!

The graphics are excellent, using overscan to fill the entire screen with 256 colours. The animation is also reasonably smooth. The background images are all digitised pictures from fairs and the colours chosen are very complementary to the sprites and foreground data. The music is in character with the scenario, but you can turn it off if preferred.

After the game has loaded you choose from nine different screens. The menu for this is set up rather neatly as a noughts and crosses tournament.

Choose the tent from the fair you want to visit next. Win a game and a nought will go there. Lose position and your enemy, ARCphile, puts his cross there. To win a tent actually means winning on two separate screens both of which must be won in order to win a nought in this position.

However, for some reason best known to the programmers you have to compete in both screens. So even if you have lost the first and know that you have lost the square, you're forced to continue – this could be better.

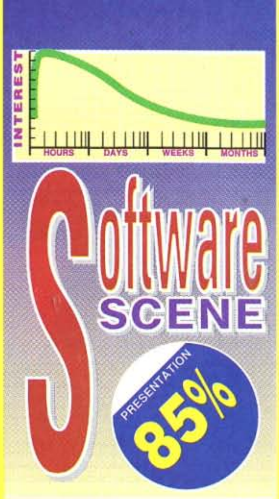
Initially I found the game very difficult because I started by playing it like Pang, trying to burst all the bubbles but this is not a good strategy. Right at the start the ice cream can be seen bouncing inside its balloon, so a better idea is to burst this first and only burst the bubbles that are likely to get in your way to collect the prize. This way the number of bubbles bouncing round the screen does not get out of hand.

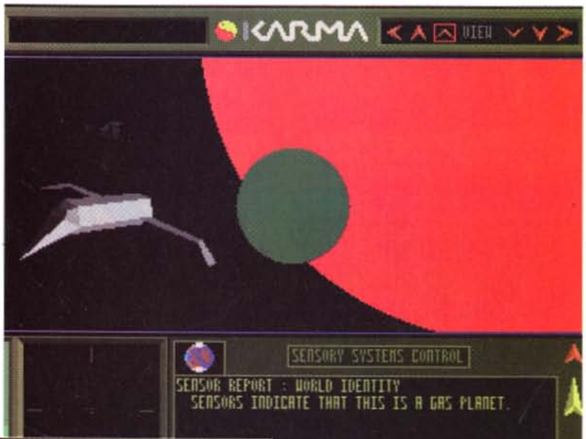
Once I got used to the game play I was able to place a nought in a target tent. Unfortunately despite many hours playing I was unable to win a complete line. However I've seen it done, so it's possible, and on game two the screens are very different.

My one real gripe is with the manual/inlay – it contains a lot of spelling and grammar errors as well as missing a couple of things. I think it would make good sense for Eterna to have their inlays proof read by an English person prior to the game's release in England as it creates a very poor first impression.

I did like Bubble Fair, it's fun to play and looks impressive – and it's got a two player option.

Tony Oakden

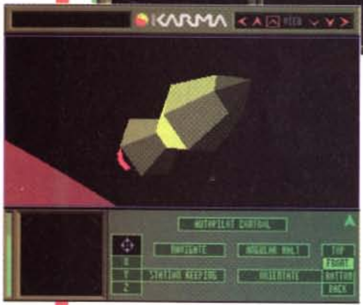




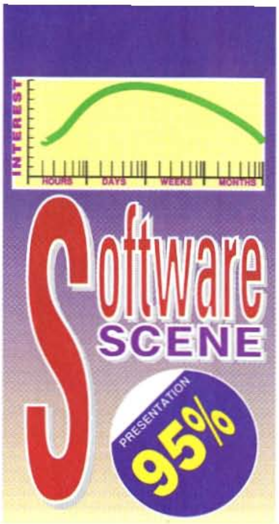
SENSORY SYSTEMS CONTROL

SENSOR REPORT : WORLD IDENTITY
SENSORS INDICATE THAT THIS IS A GAS PLANET.

Using the sensors



Switch to autopilot



Price: £24.99
Supplier: Periscope Software, 302 Wedon Way, Bygrave, Baldock, Herts SG7 5DX.
Tel: 0462 893107
Requirements: Risc OS

Karma

... hands of fate

THE Hitch-hikers Guide to the Galaxy has this to say about the universe: "SPACE is big, really big. You wouldn't believe how amazingly, mind-bogglingly big it really is..." and so on. But with Karma you might begin to get a clue about how big it really is.

Karma comes in a stylish black box, with equally stylish black manual and discs. It can be run from floppy or moved to hard disc. The manual is quite thick – although there's a lot of white space – it contains vast quantities of information on Astronomy, Geometry and Physics, most of which you will need.

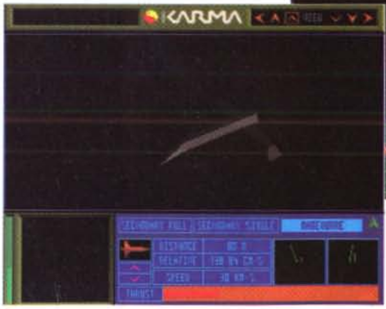
This first issue of Karma isn't the full game – it's the flight trainer, and believe me you'll need it. Unlike Elite which is just a game set in a space environment, this is a simulation of a galaxy – not a complete one, just a few thousands of stars with their associated planetary systems – together with all the laws of physics and the composition of the universe as we know it today.

Well, that's not quite true. Einstein unfortunately gave us the limit of the speed of light which is rather inconvenient for a space game. Elite gets round it with hyperspace; Karma simply ignores it and uses Newtonian physics rather than Einsteinian.

Even so it takes a long time to get up to many times the speed of light – essential for practical space flight – using simple reaction (throw something out the back very fast) motors, so the Karma ships are equipped with a number of types of drive.

Manoeuvre drive is the weakest, followed by Single Secondary, Full Secondary and Primary. Each of them can have their thrust adjusted from 0 to 100 per cent, but even at its lowest setting Primary will kick you up to many times the speed of light in just one burst.

In fact Primary is so powerful that it isn't available when you're in solar system space – it's only used for interstellar journeys. The fastest I've managed is about 250 million times the speed of light, and it still took five minutes to fly across the galaxy. Even then I didn't bump into any stars because space is so big.



A low thrust approach

So how about navigation? Thankfully it's very easy: The Karma mothership control panel is based around the concept of Targets. Each of the control panels – Manual flight, Autopilot, Star charts, Comms and Sensors – has a target area. An object can be dragged from the view window, scanner or from another target and dropped into a target area.

The particular control panel will then operate on that object. For example, a star can be dragged to the Star charts target and a description of it will then be displayed. Or dragging it to the sensors will reveal more technical information.

KARMA
AUTOPILOT CONTROL
NAVIGATE
ANGULAR HALT
STATION KEEPING
ORIENTATE
TOP
FRONT
BOTTOM
BACK

What have we here?

Navigation involves dragging the target to the panel and clicking the Navigate button, and away it goes. Unfortunately other objects are not taken into account so there's a possibility of the Navigation program trying to take you through another planet or star.

There's a trick to this: If you're near another planet, use the *Orient front* option which points you at your target, then you can see whether you need to fly away from the nearby object before engaging autopilot.

Using the Comms panel you can open communications with various objects like planets and satellites – in the Trainer all the satellites are training beacons with a specific purpose, more of which later.

Flying on manual is not easy but has to be learned because the Hopper – a short range ship – doesn't have an autopilot. The key difference between flying in Elite and in Karma is down to physics. In Elite you can speed up and slow down as if driving a car, in other words stopping is genuinely a stop.

But the real world isn't like that: In Karma you can thrust in a given direction and you begin to move. To cancel the effect you must thrust an equal amount in the opposite direction.

Now imagine you've flown into a solar system having been travelling at millions of times the speed of light.

First you have to slow down so as not to overshoot the system, then match speeds with a planet – which will be circling the star at some particular speed. It's very complex indeed. Better to use the autopilot.

Having provided a rough guide to the universe of Karma, what about the actual plot? There is one, which is a good start: You have been selected as a potential pilot of a survey vessel looking for somewhere to restart the doomed civilisation you've left behind.

You are now on a training mission to qualify as a pilot. You must follow a trail of clues – the first one is in the manual – to locate the Hopper craft and then to find the Galactic Council's Training Post. At this point you can graduate to Karma release 2.

So, how does Karma measure up to Elite? Simple: It's different. Completely different. In fact I can think of no way in which they can be directly compared. Both are hard and both are very enjoyable, but in very individual ways.

Karma has taken a very long time to get to your micro, but it's been worth the wait. I only wish I had more time to spend on it.

Steve Turnbull

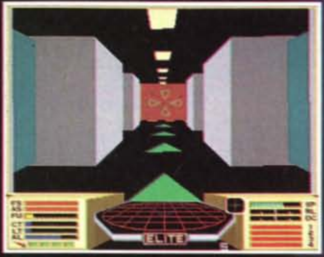
NAME: ELITE

RATING: THE BEST-SELLING HOME COMPUTER GAME

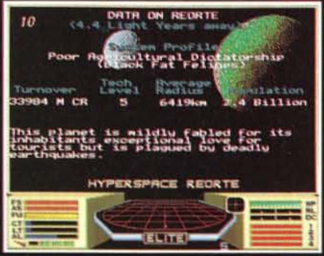
STATUS: NOW FOR THE ACORN ARCHIMEDES, A3000 AND

MICRO USER verdict: 100%

RIGHT ON COMMANDER!



INCOMING MISSILE
ELITE


10

DATA ON REORTE
(4.4 Light Years away)

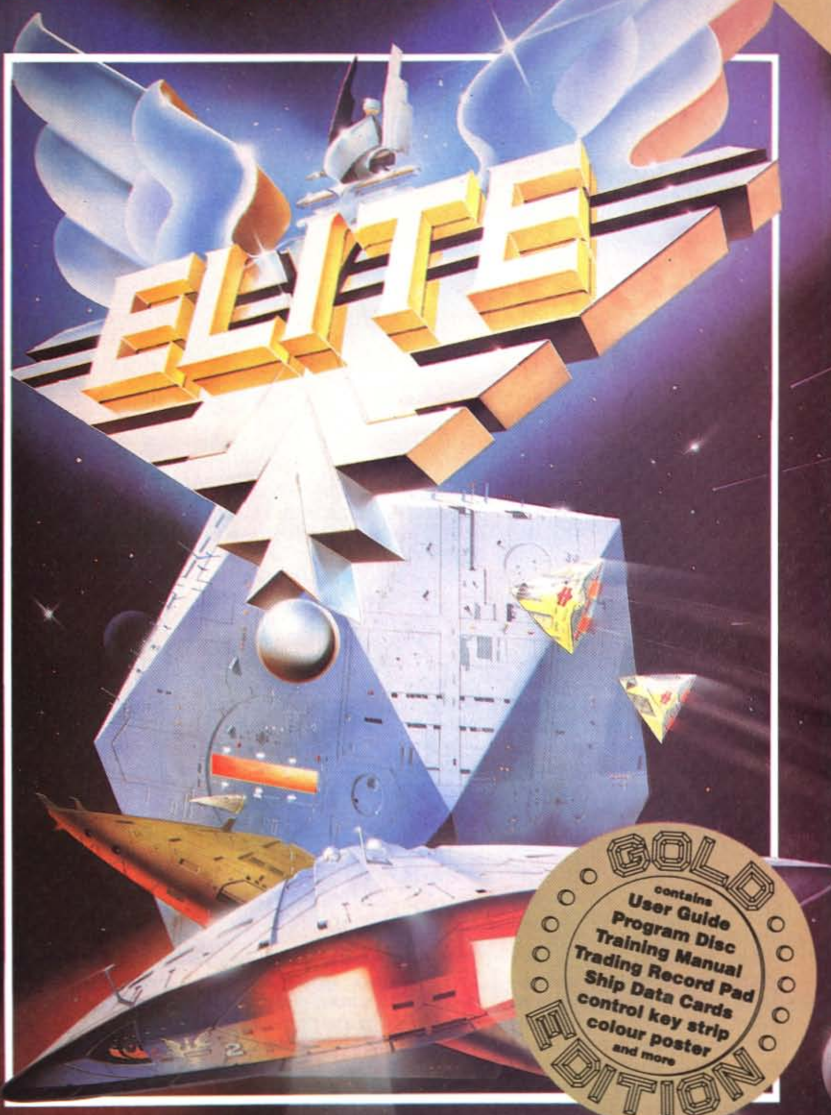
System Profile
Poor Agricultural Dictatorship
(Black Fat Felines)

Turnover	Tech. Level	Average Radius	Population
33984 M CR	5	6419km	2.4 Billion

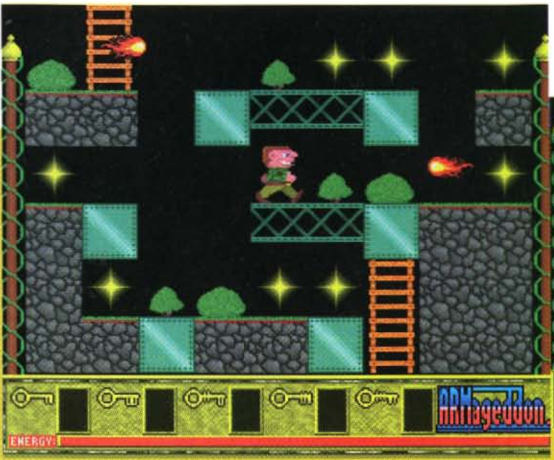
This planet is mildly fabled for its inhabitants exceptional love for tourists but is plagued by deadly earthquakes.

HYPERSPACE REORTE

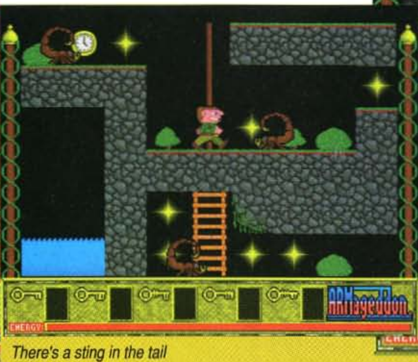
DOCKING COMPUTERS ON
ELITE


ELITE
GOLD EDITION
contains
User Guide
Program Disc
Training Manual
Trading Record Pad
Ship Data Cards
control key strip
colour poster
and more

HYBRID PRESENTS IAN BELL & DAVID BRABEN'S "ELITE"
by WARREN BURCH & CLIVE GRINGRAS for ACORN ARCHIMEDES 1MB RAM RISC-OS
£39.95 CHEQUE OR POSTAL ORDER TO HYBRID
88 BUTT LANE MILTON CAMBRIDGE CB4 6DG TELEPHONE 0223 861522



Great balls of fire



There's a sting in the tail

Eeeek...

Bobby Blockhead versus the Dark Planet

... escape from Milton Keynes

Price: £19.95
Supplier: Atomic Software, PO Box 118, Peterborough PE1 5QH.
Tel: 0733 53355
Requirements: Risc OS

THERE was a time when arcade adventures and levels and ladders ruled supreme. But as computers and gamers became more sophisticated so did the game designs. Yet arcade adventures can be the most frustrating and addictive teasers around.

Atomic Software have joined forces with public domain stars Michael and Stephen Anstis to produce a game which doesn't take itself too seriously and is one of the few around which pitches its difficulty level just right.

Some can be too difficult to start with, thwarting any advance, and consigning months of programming to an unused cupboard. Others are so simple that you zip through them pleased but wondering where your money went. Bobby Blockhead allows you to progress gradually with a password option allowing you to bypass earlier screens.

The tongue-in-cheek packaging blurb sets the scene. Not only is Bobby Blockhead a soldier, but he is also a potholer. This doesn't mean, however, that you'll be doing any caving or blasting your enemies.

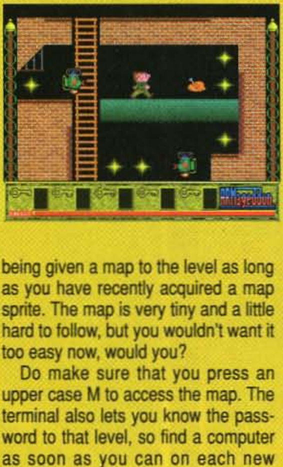
Bobby Blockhead versus the Dark Planet has your hero in the timeless pursuit of saving the Earth against yet another invasion, but minus weapons apart from a beaming toothpaste advert smile and the ability to dodge pursuers and guards dexterously.

Indeed as Bobby managed to escape capture and discover the alien plans, it is really only up to you to help him clear each of the levels of Wattinium crystals which mean death to the world as we know it. By removing these the aliens won't be able to create their war machines.

However, the strange radiation emitted has mutated a whole host of insects – I must admit I didn't know scorpions were native to Milton Keynes.

Clear the level and you can find the door to the next, getting one step nearer to the surface and freedom. You are running against the clock so you'll need some help. Roast chicken is good for replenishing energy drained by traps, automatic guards and wandering mutants. The clock sprite is essential as it resets the timer and lets you escape to the next level.

Dotted around each level is a computer and printer. Activate the computer and you'll be told how many crystals you have to collect as well as being given a map to the level as long as you have recently acquired a map sprite. The map is very tiny and a little hard to follow, but you wouldn't want it too easy now, would you?



Do make sure that you press an upper case M to access the map. The terminal also lets you know the password to that level, so find a computer as soon as you can on each new level just in case you die.

The sprites are large and colourful, the music pleasant and the sound effects clear. My only niggle is that exact placement of the hero is needed, which can be a little frustrating when you are dodging arrows, robots and rampaging wasps.

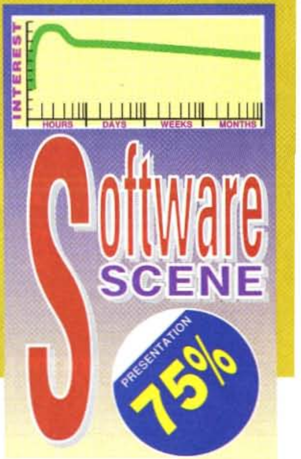
As you'd expect in this type of game there are keys, but there is a catch: There are five different types which match five different shapes of keyhole – so be attentive, your life depends on it.

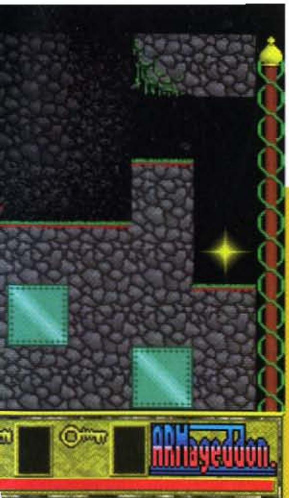
What you are holding at any one time is shown at the bottom of the screen.

There are also bridges, transporters and force fields. These are all activated by big red switches which are toggled on and off by jumping on them. Sometimes you'll need them activated, but you may have to retrace your steps a little later to access a different part of the maze.

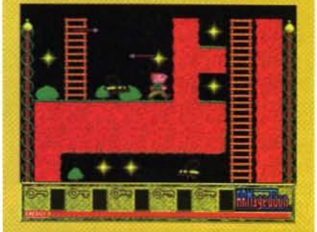
Before you load the game there is a !MaxMemory utility which sets your Archimedes to the optimum for the game. It doesn't make any permanent change and one particularly nice aspect of the programming structure is that you can run the game from any filing system – including an archive.

Archimedes subscribers can try out Bobby Blockhead versus the Dark Planet for themselves as there is a special demo version on this month's disc. The levels are different to the ones in the full game, too.





VS



It's fully key controlled, and you can redefine the keys and set sound options at the beginning of the game. The scrolling is smooth, fast and polished.

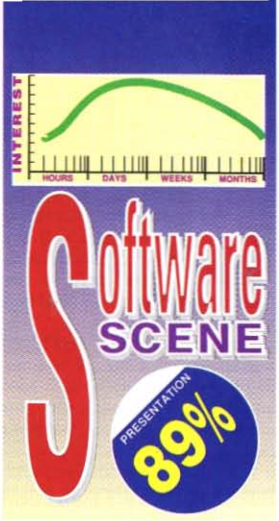
The inhabitants of the Dark Planet are obviously quite wealthy as bags of gold are just lying about. Play your cards right and you could escape a very rich potholer.

But escape will take time and you will have seen your tombstone appear engraved with RIP and heard the manic laugh of your enemies many times before you succeed. On the commiseration screen the nasty which despatched you will adorn the message just to add insult to injury.

There is a lot more to the game – working out where to go would be enough without the added complication of giant insects. At least these move in predictable patterns. On the way routes, conveyer belts and disappearing floors are just a few hazards which you must make work for you.

When you see Bobby become a white silhouette watch the energy level drop and work out how to get out as soon as possible. A well thought out game, which deserves to do well and bodes well for future Atomic releases.

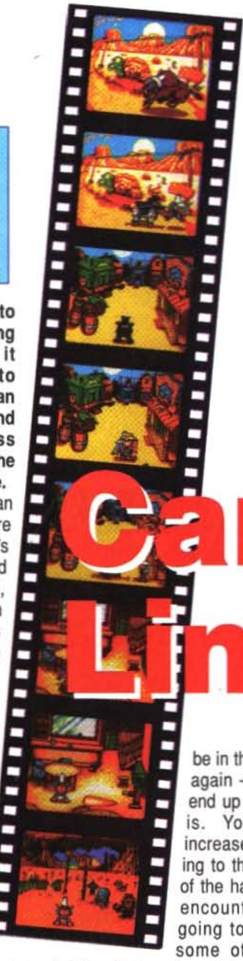
Pam Turnbull



Cartoon Line

... th-th-th-that's all f-f-folks

Price: £19.95
Supplier: Eterna/Vector Services,
13 Denington Road,
Wellingborough, Northants
NN8 2RL.
Tel: 0933 279300
Requirements: Risc OS



I WASN'T quite sure how to classify this latest offering from Eterna. Certainly it would be quite wrong to think of Cartoon Line as an arcade game pure and simple. And it's not one of those mindless shoot-'em-up games beloved of the blood thirsty, so I'll let you decide.

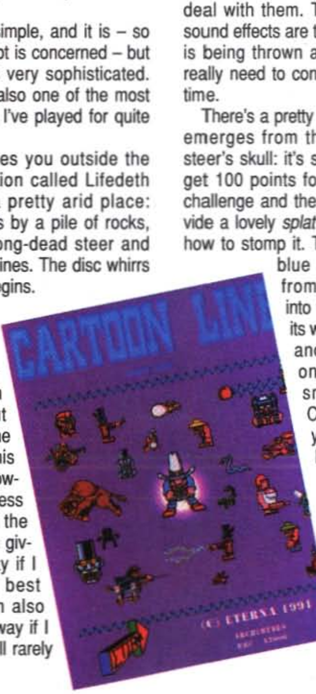
Here's the scenario. The American West is still wild, the badlands are wicked and town is troublesome. It's all because of this goldarned shaman undertaker Snow Face, who is seeking to drum up even more business. He wants yours badly enough to send along a wide variety of creatures whose sole aim in life is to see you in Boot Hill.

Your ambition, naturally enough, is survival. This depends on your performing precisely the correct action at precisely the right time. This is by no means a doddle – and Eterna recognise this by providing two levels of play, amateur and professional.

You can move your cowboy character left or right, he can jump and squat, while hitting Return will trigger a predetermined action – provided you hit it at the right time.

It all sounds simple, and it is – so far as the concept is concerned – but the gameplay is very sophisticated. Cartoon Line is also one of the most addictive games I've played for quite a while.

Level one sees you outside the town at a location called Lifedeth Junction. It's a pretty arid place: There's a cactus by a pile of rocks, the skull of a long-dead steer and some telegraph lines. The disc whirrs and the action begins.



The clue to correct gameplay depends on a split-second appreciation of what is about to take place. The very first time this happens your cowboy is more or less in the centre of the screen – and I'm giving nothing away if I say this is the best place to be. I'm also giving nothing away if I tell you that you'll rarely be in that position again – until you end up dead, that is. Your score increases according to the difficulty of the hazards you encounter. I'm going to describe some of them in detail and give a few hints on how to deal with them. The animation and sound effects are the clues as to what is being thrown at you, and so you really need to concentrate hard each time.

There's a pretty green scorpion that emerges from the eyehole of the steer's skull: it's sting is deadly. You get 100 points for facing up to this challenge and the sound effects provide a lovely *splat* when you discover how to stomp it. There's a gorgeous blue snake that enters from stage left, leaps into the air and chomps its way through you, hat and ciggie included, only leaving your smelly feet alone. Catch it in time and you can tell it to get knotted. It's worth 600 points.

A maddened buffalo shakes the ground and will toss you high before you fatally crunch on the ground. If you take the appropriate action, you'll end up on one side of the screen or the other, vulnerable to being knocked off by the next nasty to appear.

Two feathered friends need to get the bird in various ways. There's this little Tweetie-pie character who flutters in from either side carrying an anvil. Yup, an anvil. You need to figure out how to head-butt and sidestep for this one. I got a real bombed-out feeling the first time I managed it.

The other bird is a vulture – and dealing with this is a bit like tackling a chaining puzzle in an adventure game. If you can deal correctly with that hollerin' Injun you are left with the tool for the vulture business. I may be a bit gauche here, but getting that tomahawk into the right place is a real precision job.

When you have dealt with enough hazards to qualify for level two, the shaman makes an appearance along with a round of applause.

Level two pitches you against a traditional gunslinger who needs to be outfaced, a sneaky one hiding upstairs in the saloon, with a Tweety-pie bearing lighted dynamite – try stuffing that down your pants – and, worst of all, a wheelchair-bound granddad with a blunderbuss.

Together with other hazards, they try to finish you off in various spectacular ways – and the first few times it's worth letting this happen just to watch the brilliant graphics. Remember, if you get stuck, Cartoon Line is not too hard it just requires careful thought. A great game.

Mad Hatter

Laser

CHOOSING a printer should be determined by the uses and the quality of reproduction needed. This is the ideal. Unfortunately, cost must be a criterion too.

But remember, it's no good buying a computer, with a massive hard disc and multisync monitor, only to send out letters on a poor quality dot-matrix printer, with a worn ribbon, that would pass the test for MI5 encryption.

Fonts often cause confusion when buying a printer. It is easy to mistake typefaces for fonts and vice versa. The typeface is the style of print, such as Courier. Fonts are the size of characters in the typeface. For example, if you buy a printer with Courier, Serif and Script – each being able to print in 10, 12 and 14 cpi (characters per inch) – you have a machine with three typefaces and nine fonts.

Most printers can take additional typefaces by downloading into the printer's memory. More conveniently, a typeface card can often be inserted into a socket in the printer via a cartridge.

Don't be sidestepped into thinking that you need as many fonts as possible. The Archimedes market is significantly different to the PC due to the computer itself. Most laser printers are manufactured with the PC in mind so you'll find the font facilities well documented in any sales literature.

However, as the Archimedes usually prints everything as graphics it doesn't send textual information to the printer at all so the fonts are irrelevant. The only exceptions to this are when using PostScript or dropping a text file directly on to the printer icon. In these cases your output will use the fonts provided with the printer.

PostScript

On PostScript printers, if you add a new font to your computer you have to add the same font to the laser printer – this is not so much the case these days with downloadable and scalable font technology. The Archimedes scores over the PC and Macintosh so that if you have a font on your computer it will print regardless of what fonts your printer has – and regardless of the printer too.

The only exception is with PostScript which is a more specialised use but the A5000 printer drivers have been modified so that even with a PostScript printer it can download the necessary font information. We've looked in detail at 10 laser printers currently available within a similar price bracket – £1,000 - £1,300 – which are towards the less expensive end of the market.

Laser technology

For many years the cost of a laser printer combined with its physical size restricted uses to groups of micros sharing resources. Recently, laser manufacturers have seen the opportunity to create a new market by introducing a range of lower priced, personal machines with lower specifications than their larger cousins.

Laser printers work in a similar way to photocopiers. However, unlike photocopiers they compose the page using their own in-built printer language, such as Hewlett Packard's PCL or Adobe's Postscript. The laser illuminates a light-sensitive drum, collects toner – a fine, black powder – where the laser has sensitised it. The paper is then drawn in, given a static charge, thus attracting the toner from the drum. The page is ejected after heating has bonded the toner to the paper.

Despite their complex mechanism, laser printers operate at considerable speed – large multi-user models operate at hundreds of pages per minute. The minimum printing speed of a budget laser is four pages a minute.

This figure may seem impressive, but is only achievable under certain conditions. For example, when printing five copies of a letter on a 4ppm printer, copies 2 to 5 will come out at 15 second intervals. However, due to

The tests

The table on page 40 shows how quickly the printers could output one page of Edit text and how quickly the second page emerged. This was then used to calculate the fastest printing speed. The graphics test times a largish size sprite file, while the DTP test uses an Impression document with variable typefaces, point sizes, headings and pictures. All times are in seconds.

The text and graphics quality ratings are a personal assessment out of 10, with the overall assessment a rating out of five on performance, cost, ease of use and general worthiness.

the printer composing the image of the page before printing can begin, the first copy may not appear for 45 seconds or more.

Although there are many different makes of laser printer there are fewer actual *engines* – the hardware that actually puts the toner on the paper.

Check how much paper the trays will hold without needing to be refilled, especially if you are likely to be involved with long or overnight print runs. Many manufacturers produce optional trays to allow you to print envelopes and different sized documents but again not all, so decide in advance exactly what you are likely to be printing now and in a year's time.

Printer emulation

Laser printer emulation is particularly important. Looking for HP Laserjet emulation is not enough. There are now three standards: Laserjet+, Laserjet II and Laserjet III. If possible, try to get a printer that is Laserjet III compatible, as this is the latest standard. Support for scalable fonts, that can be shrunk or expanded as needed, is largely irrelevant to Archimedes owners.

However, Laserjet III is still preferable as it can print different size dots which means that graphics and text are given a smoother finish, doing away with the sometimes jagged results obtained from older machines. One of the most popular emulations currently available, PostScript has come across from the Apple Macintosh. It is a page description language which gives a great deal of control over the way a page is printed. It's a true computer language and you can do calculations in it if you really want to.

Normally the text of a letter is sent to the printer and that is where your control over it ends. With PostScript you have a computer program with which you can tell the printer to display a box at one position, shade it, add a certain piece of text in a particular font, size and rotated to a certain angle.

Before the advent of the Archimedes method of treating all output as graphics, PostScript was the only way of producing complex graphics on a printed page. For Archimedes users this emulation is used from time to time but usually only for specialised jobs.

Many manufacturers offer additional features with their machines, working only when using native commands. Unfortunately, available drivers only support the most popular laser printers so some additional features could be useless.

Most laser printers, not Postscript compatible, have insufficient memory for printing graphics – the acceptable minimum is 1Mb, although the memory of most printers can be increased using expansion cards. For full page graphics and DTP look to 2.5-3Mb. But if you buy the Computer Concepts LaserDirect, add to the ram of your Archimedes giving you a 4Mb machine. You can manage straight text output with 512k, but you should look at the costs of upgrading your system at the outset.

Refills

Canon-engined printers, used by Canon themselves, Hewlett Packard and others, use a replacement toner cartridge with a built-in drum. The drum is therefore changed each time the toner is exhausted. Manufacturers, such as Epson, use separate toner and drum units, the drum only being replaced when necessary. Third-party companies will refill some – but not all – toner cartridges thus reducing costs. But beware, cheap printers may have expensive toner and drum units which don't have a long life expectancy.

Presently, viable colour laser printers have not been developed, but the technology cannot be far away. However, it could be many years before a colour printer is available at a reasonable price.

➤

Summing up

Easily the best value or money printer, combining reasonable speed with quality is the Epson EPL-4100. Whatever use you put it to you shouldn't be disappointed.

For professional DTP and graphics use the speedy Laser Direct 8. Whereas if you don't mind a drop in quality, but want similar performance at a lower price get a Star LaserPrinter 4 with StarScript and an Arm3 processor.

For faster performance than the Epson, but still with pretty good quality output and a space saving tower casing, the Sharp JX-9500H is recommended. You'll have to hunt down the ram expansion though to avoid having to buy Sharp's expensive option.

The HP Laserjet IIIP is also worthy of note because of its excellent output, great range of add ons and cartridges and its good value peripherals – only £65 for 1Mb of ram. It is slow though.

For brute text processing speed, the strange Fujitsu VM800 has to be a contender for the more adventurous.

Wars

Adrian Jeffries and Duncan Evans guide you through the specification-ridden world of the laser printer

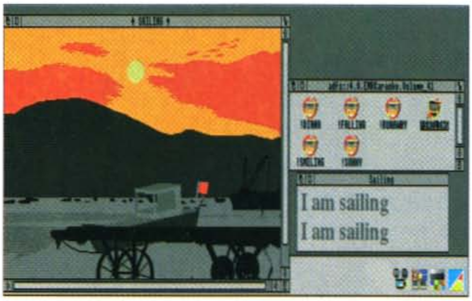
Micro User Recommendations

Model	Price	Supplier	First page (secs)	Subsequent Pages (sec)	Top speed (ppm)	Graphics (secs)	DTP (secs)	Text quality	Graphics quality	Ram size	Ram price	Rating	Comments
LP-60	£1,049	AEG Olympia 0753 630111	28.8	12	5	160	303	*******	*******	512k	£199	****	Neat LCD and range of button controls make up the front panel. There is an excellent and sturdy 250 page bin as standard and HP IIP emulation means that you turn the printer on and go.
Laser Direct8	£1,500	Computer Concepts 0442 63933	39	10	6	28	64	********	*******	1Mb	£80		Text quality was good, being nicely balanced between the Epson and the AEG, but the real strength is with graphics. If you need high volume, graphics work, this is the printer to choose.
EPL-4100 26.5	£995	Epson 0442 61144	11.5	5.22	135	305		*********	*********	512k	£173(2Mb)	*****	Includes new Epson resolution technology controlling the extent jagged lines are smoothed. With deep blacks, good shading as well as brilliant edging control this printer is outstanding value for money.
VM800	£1,436	Fujitsu 4 081-573 4444	28.5	7.25	8.28	148	264	******	*****	1Mb	-	***	The quality of graphics and large characters let it down with the characters dotty, lines edgy and even the solid blacks are not consistent. Inside is one huge but easy installed toner and drum cartridge.
HP Laserjet IIIP	£1,179	Hewlett Packard 0344 369369	40	14.6	4.11	150	332	********	********	1Mb	£65	****	Very slow on the text and DTP front, though the quality was good. Graphics quality is excellent with good blacks, rounding and shading. Low cost of its ram upgrades make it suitable for general use.
F-800T	£1,350	Kyocera 0734 311500	26.8	8.5	7.06	120	310	*******	*******	512k	£169	***	250-page feeder as standard, which would be excellent except for the plastic lid/single sheet feeder which falls off. The toner cartridge and drum are separate, with toner being added through a third container.
KX P4420	£1,195	Panasonic 0344 853915	29.3	7.5	8	131		*******	******	512k	-	***	While the sprite test proved that the Panasonic had decent processing power – and it rated in the top half of the test – it was not so successful with DTP. Inexpensive.
MicroLaser	£1,095	Texas 0234 270111	21	9	6.67	129	370	*****	*****	512k	£59	**	A fast first page and 6.67ppm top speed were a great surprise. Quality is mediocre and it performed slowly in the DTP test. Graphics test was quite respectable. The Sharp offers the same casing, but better performance.
JX-9500H	£995	Sharp 061-205 2333	23	7.5	8	140	316	*******	*******	512k	£289	***	A faster version of the Texas MicroLaser, right down to the case, control panel, tower block style, and space saving paper tray, but with superior speed and quality. Suitable for general use.
LaserPrinter4	£1,000	Star 0494 471111	36	14.5	4.14	147	360	******	*****	1Mb	£140	**	Inexpensive but stylish. Includes StarScript which still gives slow text printing, but the graphics speed was accelerated by three times. Worth considering if you need PostScript. One of the easiest lasers to fit.

A wider perspective

Make/Model	Price	Supplier	Max resolution	Pages per min	Ram	Paper trays	Sheets per tray	Option trays	Toner life (sheets)	Drum life (sheets)	A3/A4	Comments
HL-8QS	£2,995	Brother 061-330 6531	300dpi	8	2Mb	3	200	Letter legal	4,000	4,000	A4	PostScript compatible offering advanced text and graphics and quality print. Memory upgradeable to 6Mb with 13 typefaces giving 35 font families and optional Appletalk.
LBP-4	£1,095	Canon 081-773 3173	300dpi	4	512k	1	50	250sheets/envelope feeder	3,500	3,500	A4	Toner and drum are in one unit. Optional emulations are available to allow ProPrinter, PostScript, Laser Twin and Epson FX emulations.
ProScript 12	£2,695	Citizen 0895 272621	300dpi	11	512k	2	250	Multisheet feeder	8,000	20,000	A4	A business laser printer typical of the PC market. It's easy to use LCD control panel is multi-lingual and has an optional four port sharer device.
Extraplus 7008	£1,495	Kodak 0442 61122	300dpi	8	1.5Mb	1	200	Envelopes/manual	1,500	10,000	A4	The control panel produces messages in five European languages and the manufacturers report that it is suitable for a monthly output of 9,000 pages.
MP904	£949	Mannesman Tally 0734 788711	300dpi	4	512k	1	100	300 sheet bin	1,500	10,000	A4	Compact (365x405mm) and quiet (46dBa). This laser can be upgraded, for instance a 904PS PostScript model is available for £1,838.
SilentWriter2 560P	£1,895	NEC1 081-993 8111	300dpi	6	2Mb	1	200	N	6,000	6,000	A4	With Licensed PostScript, HP LaserJet II, emulations this printer has a Motorola MC6800 32-bit CPU running at 16.7MHz to give fast processing.
OL400	£899	Oki2 0753 531292	300dpi	4	512k	1	200	Second bin	2,500	12,000	A4	Slimline LED personal page printer. Aimed at the first time buyer it gives quality graphics for letters, reports and low volume DTP.
PG306	£1,199	Olivetti 0908 69790	300dpi	6	512k	1	150	N	1,500	10,000	A4	A very versatile laser printer which is marketed at applications needing fast and good quality text print.
Super Series II	£1,555	Qume 0734 584646	300dpi	6	1.5Mb	1	100	N	7,500	20,000	A4	It is one of Qume's Crystal Print range that the Laser Direct is based around. Not built for heavy duty printing.
Xerox 4010I	£995	Rank Xerox 0895 25113	300dpi	4	512k	1	100	300input/20 output	1,500	10,000	A4/US	PostScript emulation is optional and it has 11 resident fonts with a cartridge slot for more. A compact printer which will handle 5,000 pages per month.
VP041I	£1,189	Victor 0494 461600	300dpi	4	1Mb	1	50	N	3,500	3,500	A4	A page printer sold for personal use with a Canon engine which is versatile and quiet. Doesn't take up too much desk space and is easy to use.

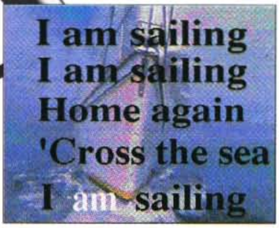
Microphone in hand, Ian Waugh tests out a Karaoke machine for the Archimedes



I am sailing
I am sailing

Sing it again, Sakimoto

Product: Karaoke Performer
Price: £19.95
Supplier: EMR, 14 Mount Close, Wickford, Essex, SS11 8HG.
Tel: 0702 335747
Requirements: Risc OS



I am sailing
I am sailing
Home again
'Cross the sea
I am sailing

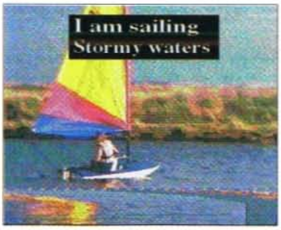
KARAOKE has been described as a cross between entertainment and humiliation. Having been on the receiving end of many professional singers who can't sing, I know what they mean, particularly when amateurs insist on getting in on the act. The Japanese ethic of *having a go* may endear you to the boss in Japan but it does nothing for the sufferers in your local.

Assuming that karaoke is here to stay, why not make the most of it? EMR's Karaoke Performer is designed for use in the privacy of your own home. Although I suppose an enterprising pub landlord who was too mean to hire a proper karaoke machine could drag his Archimedes into the lounge and set up an impromptu karaoke evening. Just keep it well away from flying glasses and beer globules.

The karaoke disc is not copy-protected – full marks to EMR for this – but before use you have to enter your name and a registration number after which you can make a backup copy. Although this may not be a 100 per cent effective deterrent against thieves, it will ensure that any copies can be traced back to source.

The Karaoke Performer package consists of the program and a backing tape. The tapes are produced by Clarity Music. There are 90 currently in the collection – available separately from many sources at £5.00 each – each containing six songs. So you can learn the tune, one side of the tape contains the melody the other side purportedly doesn't. Actually there is a bit of one which can be quite noticeable. The words are on the cassette insert.

The backings are reasonable for the price – if a little unimaginative and conservative. Don't expect Stan Kenton's big band or a Stock, Aitken and Waterman production – as if you'd want it anyway. The program is installed on the icon bar in the usual way. The songs come in folders which are named after the number of the cassette tape. Put the tape in your cassette player and on the Archimedes open a folder and click on a song. After loading a song, the Info option shows its name and duration – and who the program is registered to.



I am sailing
Stormy waters

A window appears showing the first few words and the menu button brings up a list of options. Two display modes are available: One opens a window which almost fills the screen, the other uses a small area.

There's a video mode for use with genlocking equipment and just in case your audience doesn't feel like applauding you can make your Archimedes do it for you – short, medium or long durations can be programmed to play after the song finishes. This comes through the Archimedes' speaker so you may want to amplify it.

Having set the options, you select Play from the menu and start the tape. As soon as you hear the music, press the mouse button. From that point on the program takes over and highlights each word in time with the music.

The main problem – and one I suspect the majority of users will have – is that of the words running out of synchronisation with the music. This will happen if your cassette deck runs at a slightly different speed to the one the music was recorded on.

Most domestic cassette players are not accurate and if they are out by only a small amount, the words will drift out of synch. Of course, when you know the words, you won't need the word display option although it does seem to be part of the karaoke ethic.

The review version of Performer lets you re-record the timing but you have to tap the spacebar in time with *every* word. This means, apart from anything else, that you need a pretty good knowledge of the song. However, the production version should have been updated to allow you to adjust the overall duration without doing this – far more sensible. It should also include real-time adjustment during playback.

Karaoke Performer also includes a public domain version of Ace Computing's Projector and an animation suitable for use with one of the songs. This runs completely separately, however. It would be nice if it could have interfaced with the video mode.

If you have genlocking equipment you could produce professional karaoke videos. In Mode 16 you can run the animation on one side of the screen while displaying the words on the other using the Normal display mode which uses a small window. In Full mode the large window covers more than half the screen and you can't resize it or move it because if you click the mouse the program stops.

In Normal mode you can perform other functions from the desktop although this will slow down the word display. Running the animation slows the words up, too, which seems to indicate that the timing is controlled by the Wimp rather than a real-time clock.

If you are really tempted by the Japanese way of doing things – apart from the essential occasional indulgence in raw fish, you might also like to check out EMR's Karaoke Kid at £69. This is a stand-alone piece of hardware with dual microphone inputs, echo controls and stereo speakers that will let you mix the backing tracks with the vocals.

Summing up

If you're a bathroom singer or enjoy doing a turn at the local – with or without a karaoke machine – Karaoke Performer could be just your form of entertainment.

It's a good way of learning songs and, hopefully, by the time the production units are out, problems with the timing and synchronisation will have been sorted out.

Focus on

WE NOW know how to fill pages with text, either by typing straight into the document or by importing a text file from some other source. But you can do as much with a typewriter – so where does DTP have the advantage? The answer comes from the many ways you can manipulate text, both as you type it in and what you can do with it afterwards.

The ruler, which we saw in the December issue, is used to set left and right margins. However, the way in which text is arranged between margins – its format – is determined from the Effects submenu in Impression and Impression Junior, and can also be defined as part of a style in Impression. There are four possible formats, three of which are much like arrangements with tabs – ranged left, ranged right and centred.

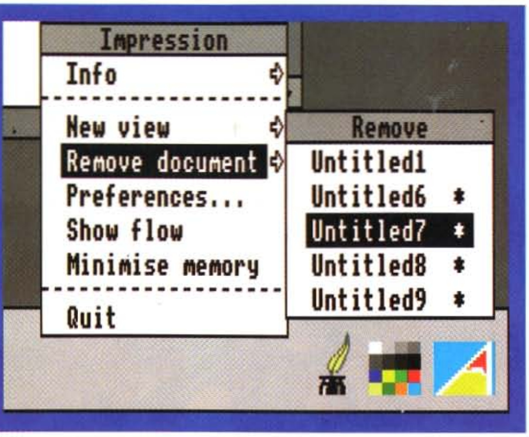
The fourth is special in that the spaces between words aren't the same from line to line as in the other three, but vary so that the right margin is straight as well as the left margin. This is called fully justified text and *The Micro User* uses it in all its articles. Each format has its own uses – and a variety of names – as well as advantages and drawbacks, as Figure I illustrates.

KEY TIP

Good housekeeping

From time to time during a session, save memory by discarding surplus documents you have been working on and no longer need.

Click Menu on the Impression icon and use the Remove document option. This doesn't affect documents on disc, just those in memory.



White space and hyphens

The problem with words is that they don't always fit neatly on a line. You may get either a very ragged right edge or, if the fully justified form is being used, lots of white space within text lines – especially if the text size is large compared with the line length. One way round this is to rewrite the text, but a simpler alternative is to break words by adding hyphens.

Figure II shows the effect of inserting hyphens manually in long words at the start of new lines to tidy up the appearance of text with wide gaps between words. Even better is to add invisible hyphens that will only be used if necessary. These are so-called soft, or conditional, hyphens. In Impression just hold down Control as you type the hyphen to insert one.

If there isn't room to take the partial word back to the previous line, nothing will happen, otherwise the word will be split at that point. The soft hyphen will continue to exist as part of that word.

Hyphenation can be done manually or you can leave it to your DTP software – it's available in Impression, Ovation and Acorn DTP. If you opt for automatic hyphenation the word breaks will be chosen by the software but may not be correct, though horrors such as reap-pear, the-rapist and mate-rial will be avoided.

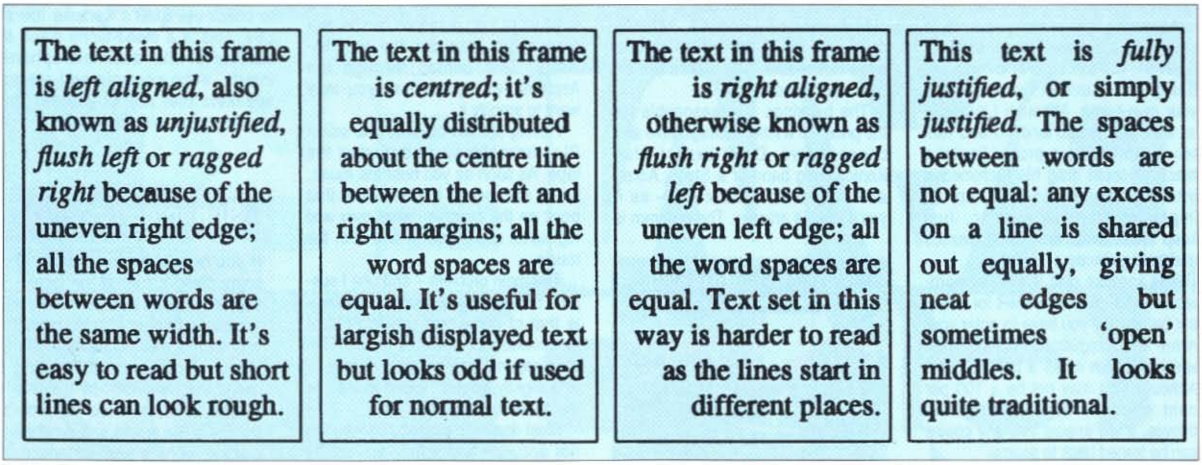
Hyphenation exception

If your DTP software insists on breaking words in the wrong place, add the words to the hyphenation exception dictionary, which is a list of words that the program consults before deciding where to put a hyphen. You can either prevent a word from being broken or indicate preferred hyphenation places.

The rule to follow is that the break shouldn't create separate words that will make the reader misread the line. They should occur between word syllables and shouldn't push one or two letters across to the next line. For example the word *inhibit* should only be split *in-hibit* and not *inhi-bit* or *inhib-it*.

Impression gives you two ways of turning automatic hyphenation on. One is with the Edit style dialogue box and the other is via the Preferences options, which we shall examine later. Impression Junior uses only the latter technique as it doesn't have styles.

Another way of avoiding wide open spaces in text is by using a technique called tracking, currently



The text in this frame is *left aligned*, also known as *unjustified*, *flush left* or *ragged right* because of the uneven right edge; all the spaces between words are the same width. It's easy to read but short lines can look rough.

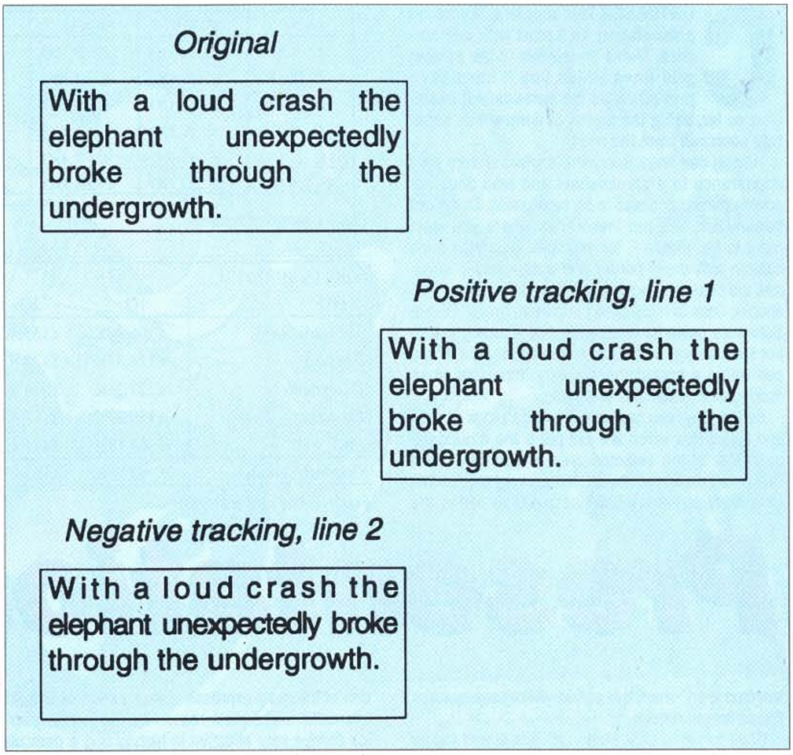
The text in this frame is *centred*; it's equally distributed about the centre line between the left and right margins; all the word spaces are equal. It's useful for largish displayed text but looks odd if used for normal text.

The text in this frame is *right aligned*, otherwise known as *flush right* or *ragged left* because of the uneven left edge; all the word spaces are equal. Text set in this way is harder to read as the lines start in different places.

This text is *fully justified*, or simply *justified*. The spaces between words are not equal: any excess on a line is shared out equally, giving neat edges but sometimes 'open' middles. It looks quite traditional.

Figure I: The four types of text format

only available with Ovation. With this facility you can add or subtract tiny spaces between letters in words, which has the effect of either sharing the extra space more evenly in the line or causing a word from the next line to be brought back or made hyphenatable. Figure III shows what this looks like.


Original

With a loud crash the elephant unexpectedly broke through the undergrowth.

Positive tracking, line 1

With a loud crash the elephant unexpectedly broke through the undergrowth.

Negative tracking, line 2

With a loud crash the elephant unexpectedly broke through the undergrowth.

Figure III: Tracking can increase or decrease letter spacing

Paragraph spacing

In word processing it's normal to type two Returns at the end of each paragraph, which gives a line of white space. In DTP this isn't necessary because other cues are possible, such as indenting the first line of every paragraph or defining a paragraph style to include a space above or below the paragraph – see last month's issue.

However, some kinds of text, particularly ReadMe files, have a single Return at the end of every line as well as two between paragraphs. Sorting it out manually is slow, so it is fortunate that Impression provides a module called LoadReturn to filter out such untidinesses.

Spelling bee

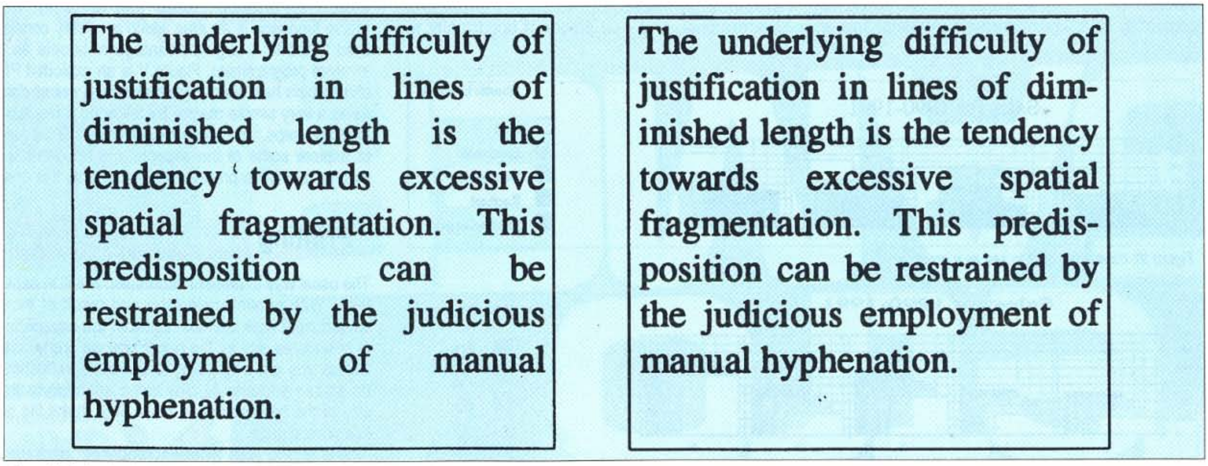
Another thing that DTP programs can do is correct your spelling. If you want, a spelling dictionary can be loaded that will either check words as you type them – though this can be distracting – or check single words or chunks of text once you've finished.

You can extend the dictionary by adding words of your own – correctly spelt – to the list and saving it to disc.

Impression also lets you build up and save one or more lists of words to be ignored rather than checked, which is useful for proper names. You may be wondering how you can set up multiple columns on page, or scatter pieces of a story about, without chopping the story into bits and giving each its own frame. It's easy – you just link the frames together so they form a continuous chain through which the story flows.

You can try this out by creating several smallish frames in a fresh document with the copy of Impression Junior on the demonstration disc, then clicking Select in the first frame, followed by Adjust in each of the others. Notice that the caret stays in the first frame. Now import a text file of reasonable length into the first frame and watch the story flow through them all. Not only that, but the software has automatically added new pages containing copies of the frames to hold the entire story.

● *Next month we take a look at creating master pages and frames.*


The underlying difficulty of justification in lines of diminished length is the tendency towards excessive spatial fragmentation. This predisposition can be restrained by the judicious employment of manual hyphenation.

The underlying difficulty of justification in lines of dim-inished length is the tendency towards excessive spatial fragmentation. This predis-position can be restrained by the judicious employment of manual hyphenation.

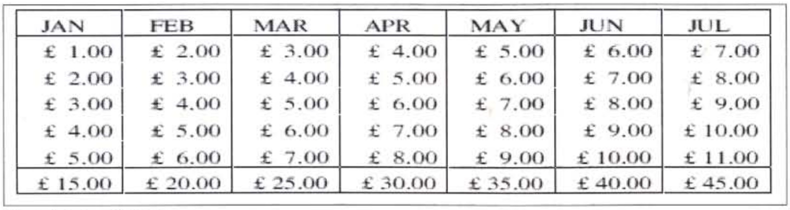
Figure II: Using hyphenation to reduce line spacing – and save lines

Presentation make

CONTINUING last month's theme on presentation we'll start with cell borders. These are similar to the system grid lines which you'll have seen printed on all the spreadsheet examples so far, being the matrix of lines which separate each cell from the next.

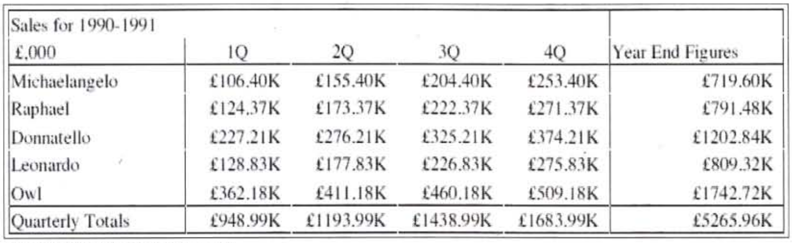
Having cell lines everywhere gives a very rigid appearance to a spreadsheet and also does not enable particular areas to be highlighted. Using cell borders lets you put these lines where you want them to be. Figure I, for example, separates each column with a cell border and puts a line to separate the column headings and the column totals with specific lines to highlighting important areas. One of Schema's powerful features is that it allows you to put lines above, below and to the left or right of any cell within a spreadsheet – very important when making your material presentable.

By the way, you can select a large block of cells and select Box which will just put a line around the perimeter of the selected area or you can select Box and then above, below, left and right which will effectively put every cell line possible within the selected area. The Clear option will remove borders you no longer require.



JAN	FEB	MAR	APR	MAY	JUN	JUL
£ 1.00	£ 2.00	£ 3.00	£ 4.00	£ 5.00	£ 6.00	£ 7.00
£ 2.00	£ 3.00	£ 4.00	£ 5.00	£ 6.00	£ 7.00	£ 8.00
£ 3.00	£ 4.00	£ 5.00	£ 6.00	£ 7.00	£ 8.00	£ 9.00
£ 4.00	£ 5.00	£ 6.00	£ 7.00	£ 8.00	£ 9.00	£ 10.00
£ 5.00	£ 6.00	£ 7.00	£ 8.00	£ 9.00	£ 10.00	£ 11.00
£ 15.00	£ 20.00	£ 25.00	£ 30.00	£ 35.00	£ 40.00	£ 45.00

Figure I: Using cell borders



Sales for 1990-1991					
£,000	1Q	2Q	3Q	4Q	Year End Figures
Michaelangelo	£106.40K	£155.40K	£204.40K	£253.40K	£719.60K
Raphael	£124.37K	£173.37K	£222.37K	£271.37K	£791.48K
Donnatello	£227.21K	£276.21K	£325.21K	£374.21K	£1202.84K
Leonardo	£128.83K	£177.83K	£226.83K	£275.83K	£809.32K
Owl	£362.18K	£411.18K	£460.18K	£509.18K	£1742.72K
Quarterly Totals	£948.99K	£1193.99K	£1438.99K	£1683.99K	£5265.96K

Figure II: Who's the best salesman?

Don't forget to click Menu on Default and toggle the System grid off to see the effect of the cell borders. Schema and most packages are wysiwyg – What You See Is What You Get – so don't forget to turn off the grid lines and labels if you don't want your document to look like a spreadsheet but like a diagram or table.

Graphics

All of the style and presentation methods we have looked at so far have dealt with improving the look of what is basically a matrix of data. Many of today's spreadsheet packages have one further option for presenting data – graphical representation. This is one of the most expressive ways I know of showing information. The main reason for this is that graphics can be very effective in highlighting a particular set of data which the brain can then assimilate. A matrix of data, although able to show as much – if not more – has to be studied longer before the same information can be absorbed.

Figure II is an example we have used in an earlier article depicting the four quarters sales figures for five salesman. How long does it take you to look at this to discover which salesman consistently sold the greatest amount throughout the year?

Look at Figure III, which is a bar graph of the same data. You'll should be able to see that Owl out performed all other salesman throughout the year.

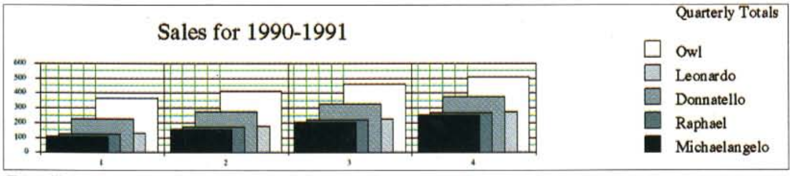


Figure III: It's much easier to see as a graph

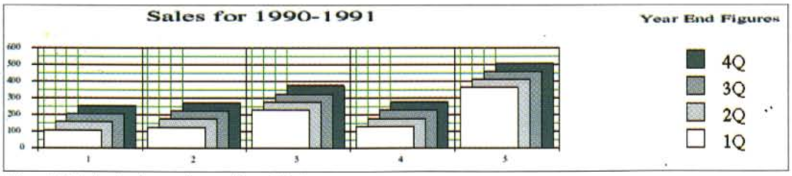


Figure IV: A simple change shows different features

Spreadsheet packages such as Schema and graphing applications such as GraphBox Professional, give you plenty of opportunity to investigate and explore a variety of methods of displaying data. The important thing to remember is what information you are trying to show. Figure III for example is a bar graph using column orientation. You can see at a glance the performance of each salesman in the year.

If we change this bar graph to row orientation – see Figure IV – you could then see that sales increase throughout the year and that the 4Q is the best selling quarter. With an amount of experimentation with the choices that are now available – bar, stacked bar, line, area, plot and pie charts – you'll soon find a way of expressing data in the way most likely to convey the information quickly.

Later in this series we will look at the macro language – an aspect of modern spreadsheets which gives them increased power and versatility. The macro language is an area which is usually considered taboo to a large percentage of people as it involves programming. Figure V is an exploded Pie chart which has been produced from a set of data using a very simple macro. By following a few rudimentary steps, and some examples, you'll be able to explore some of the aspects and opportunities macros provide to produce graphs such as this one.

Printing

The usual way to present information is still in paper form. With printing being the end result of most spreadsheet work we must consider the capabilities of printers as well as the paper size we are to use. Unless you are only going to use the spreadsheet on screen you should play close attention to the size of the spreadsheet to make sure that it fits on to a printed page.

This is one area where spreadsheet packages leave you in the dark. There are no page markers to

Barry Mallett continues to show how to make your spreadsheets shine

```
|      |         A         |     B     |     C     |     D     |     E     |
|======|===================|===========|===========|===========|===========|
|    1 |Sales for 1990-1991|           |           |           |           |
|    2 |  ,000             |   1Q      |   2Q      |   3Q      |   4Q      |
|    3 |Michaelangelo      |   106.40K|    155.40K|    204.40K|    253.40K|
|    4 |Raphael            |   124.37K|    173.37K|    222.37K|    271.37K|
|    5 |Donnatello         |   227.21K|    276.21K|    325.21K|    374.21K|
|    6 |Leonardo           |   128.83K|    177.83K|    226.83K|    275.83K|
|    7 |Owl                |   362.18K|    411.18K|    460.18K|    509.18K|
|    8 |Quarterly Totals   |   948.99K|   1193.99K|   1438.99K|   1683.99K|
|      |         F         |
|======|===================|
|    1 |                   |
|    2 |Year End Figures   |
|    3 |            719.60K|
|    4 |            791.48K|
|    5 |           1202.84K|
|    6 |            809.32K|
|    7 |           1742.72K|
|    8 |           5265.96K|
```

Text printing for rough results

```
A1:"Sales for 1990-1991"
A2:" £,000"       B2:"1Q"    C2:"2Q"   D2:"3Q"   E2:"4Q"   F2:"Year End Figures"
A3:"Michaelangelo"B3:106.4   C3:B3+49  D3:C3+49  E3:D3+49  F3:SUM(B3><E3)
A4:"Raphael"      B4:124.37  C4:B4+49  D4:C4+49  E4:D4+49  F4:SUM(B4><E4)
A5:"Donnatello"   B5:227.21  C5:B5+49  D5:C5+49  E5:D5+49  F5:SUM(B5><E5)
A6:"Leonardo"     B6:128.83  C6:B6+49  D6:C6+49  E6:D6+49  F6:SUM(B6><E6)
A7:"Owl"          B7:362.18  C7:B7+49  D7:C7+49  E7:D7+49  F7:SUM(B7><E7)

A8:"Quarterly Totals"
B8:SUM(B3><B7)
C8:SUM(C3><C7)
D8:SUM(D3><D7)
E8:SUM(E3><E7)
F8:SUM(F3><F7)
```

What each cell contains

s all the difference

indicate where the edges of a sheet are, so you have to rely on guesswork when defining these boundaries. As you should have considered the final result when you were making the spreadsheet model for your stationery cupboard, this shouldn't be a problem now.

Printing methods

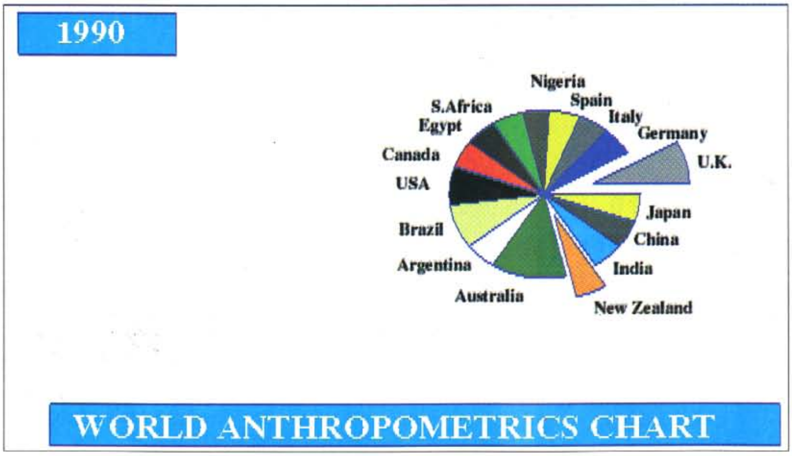
Dot matrix printers are by far and away the most likely printer that you'll have at your disposal. So I'll address my comments to these printers although, in most cases, the comments will apply to all types.

There are two printing terms which you'll come across – Text and Image printing. Text printing is where you use the printer's own fonts. This is a very quick method of getting a rough draft of your spreadsheet to check that the information is correct. This is usually printed with the column and row labels on so that you can work on the sheet and easily reference a cell that you wish to adjust.

The above example is a text print of Figure II. This is a lot faster to print than Figure III, although far less presentable. But it is sufficient for anyone to understand and check.

When you are inserting formula into cells of a spreadsheet it is often difficult to decide what data should be included. The information displayed in each cell can normally be adjusted to either display the formula that is contained within the spreadsheet cell or the result of calculating that formula – the answer.

Schema has an option which allows you to print out all formula on a separate sheet. This is very useful when you're checking that you have referenced each cell correctly within these formula.



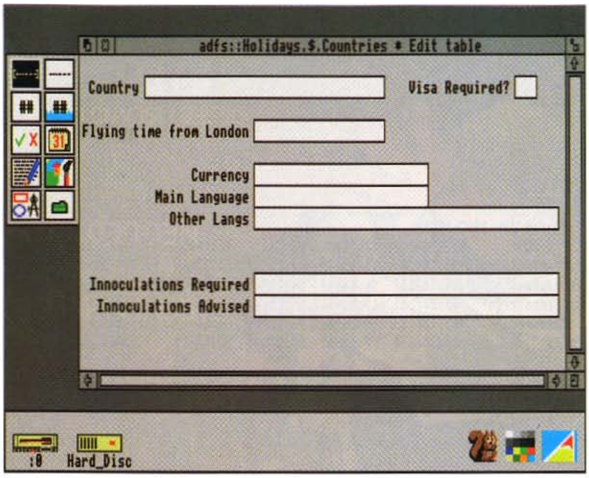
The formula is...

The record example above is once again Figure II as a text print, but this time displaying the formula contained within each cell rather than the answers. You can now see that in most cases I did not enter figures for the amount of sales each person made in each quarter, I merely added a set amount to each persons first quarter number. For instance, the second quarter sales figure (C5) for Donnatello is actually his first quarter figure (B5) plus 49.

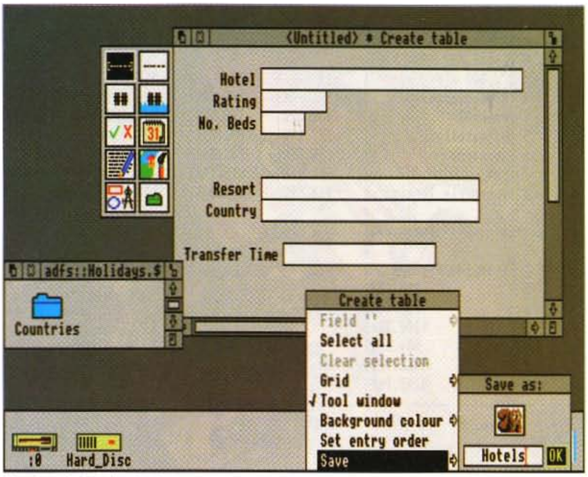
Image – or graphic – printing is where all items are printed via the computer, as a series of dots. More familiarly this method is adopted when drawings are being produced from applications such as !Draw and !Paint. If you've used this method you'll know how much slower this can be – depending upon your printer of course. It also depends on the resolution you're using – the number of dots per inch and grey scaling you opted for.

Graphic printing does allow greater flexibility. Grid lines or borders become straight rather than lines of dashes and you have a choice of fonts and sizes. Shades of grey can be used to depict low interest areas with black used to highlight important areas. This is the method used for printing spreadsheets and graphs for presentation materials.

- *Next month we'll look at Replication – the art of making the package do the work.*


adfs::Holidays.$.Countries * Edit table
Country
Visa Required?
Flying time from London
Currency
Main Language
Other Langs
Innoculations Required
Innoculations Advised
:0
Hard_Disc

Creating the countries database


<Untitled> * Create table
Hotel
Rating
No. Beds
Resort
Country
Transfer Time
adfs::Holidays.$
Countries
Create table
Field ''
Select all
Clear selection
Grid
√ Tool window
Background colour
Set entry order
Save
Save as:
Hotels
OK
:0
Hard_Disc

Creating the hotels database

Relatively speaking

SO FAR this series has concentrated on databases with a straightforward structure. In this month's article we'll look at a more complex structure – and a buzz word of the moment – relational databases.

Common examples of database packages which support this feature on Risc OS computers are MultiStore, Flexifile and Squirrel. While the advantages of relational databases can be overstated, they do have many powerful features that are often overlooked.

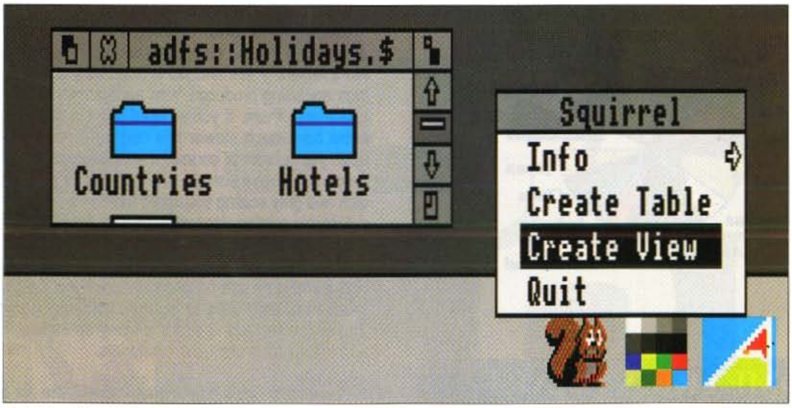
To find out more we will look at a typical use for a relational database. Suppose that a travel agent wants to have a database containing some basic information about the holidays he sells.

Typically such a database would contain details of hotels, as well as more general information about the country in which they are situated. A standard database containing this information is very wasteful, with a lot of repeated information, taking up extra file space and typing time. A relational database solves this problem by splitting the information between two files. One has the details of the individual hotels and the other has the more general information about the country.

This way the country data is only entered and stored once, even though there may be several hotels in each country.

The system is set up so that each time information about a particular hotel is displayed the appropriate record describing the country is automatically selected.

The two databases are said to be linked and as both have the country as one of the fields, they are said to be related by country.


adfs::Holidays.$
Countries
Hotels
Squirrel
Info
Create Table
Create View
Quit

Selecting a New View

Creation

Relationally linked databases are easy to produce using DSL's Squirrel. It is a matter of creating the two separate files and then linking them together in a View.

The first database is of the countries. For the sake of this example let us suppose that the information required is fairly general covering things like distance from London, language, currency, innoculations and visas. This is created just like any ordinary Squirrel database.

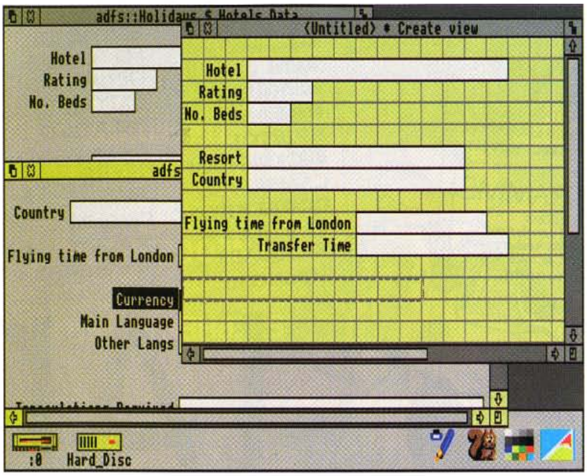
The hotels database is created in a similar fashion. Suppose that the information required is the size and rating of the hotel, the resort, country and transfer time from the local airport.

The first stage of tying the two databases together is to set up a View window containing a combination of the fields required from each. Click the menu button over the squirrel icon on the icon bar and select Create View. This displays a window very like an empty database setup window.

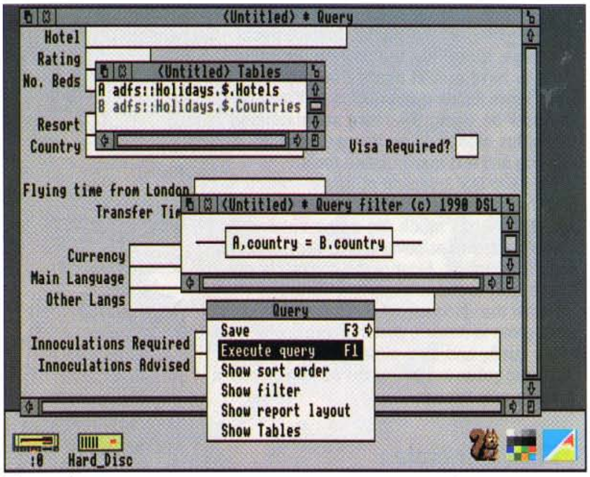
Next both the hotels and countries databases are opened and their individual fields are dragged and positioned in the View window.

The first field dragged into the window must be

John Allen takes a look at relational databases


adfs::Holidays.$.Hotels Data
(Untitled) * Create view
Hotel
Rating
No. Beds
Resort
Country
Flying time from London
Transfer Time
Currency
Main Language
Other Langs
Innoculations Required
:0
Hard_Disc

Laying out the View


(Untitled) * Query
Hotel
Rating
No. Beds
Resort
Country
Visa Required?
Flying time from London
Transfer Time
Currency
Main Language
Other Langs
Innoculations Required
Innoculations Advised
Query
Save F3
Execute query F1
Show sort order
Show filter
Show report layout
Show Tables
:0
Hard_Disc

(Untitled) Tables

A adfs::Holidays.$.Hotels
B adfs::Holidays.$.Countries

(Untitled) * Query filter (c) 1990 DSL

A.country = B.country

The complete query

from the hotels database, making that file the dominant – or main – one. The country field from the hotels database should be used – this will later be linked to the corresponding field in the other file.

Making the right connection

Linking is the only tricky bit of relating the two files to each other. The first stage is to select Define Query in the View window menu to display a Query window.

Selecting Show Tables in this window's menu will list the files used to make up the view of the two databases and give a prefix letter for each of them. Keep this window on the screen.

The link between the two databases is a match between their country fields. Select Show Filter from the Query menu to show the filter window and drag the country field from the view window into it.

The window shows part of the link. Note that the field is prefixed by the letter corresponding with the original database, so the field is described as A.country which means the field country from the hotels database, denoted by the prefix A.

To link this to the country field of the countries database type B.country – the country field from the countries database, which has the prefix B – between the quote marks and press Return to set the link.

Records can be displayed in a particular order by selecting Show Sort Order from the Query window menu and dragging the appropriate fields into it. In this case a suitable order may be alphabetical order of country, resort and then hotel. This is achieved by dragging those fields, in that order, into the sort window.

The two original database windows are no longer required and can be closed to give a less cluttered screen. To get a complete combined view of the two files select Execute Query from the menu and the hotels file will be linked with the countries file to give a combined View.

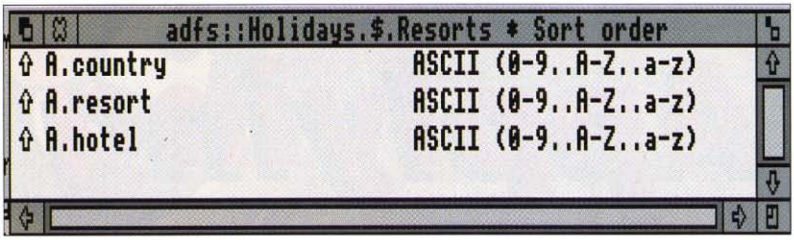
Filing your results

The relationship can be usefully saved in two ways. If the Save as Table option is selected, a new database combining the two previous ones will be created. This will contain duplicated information and, if any record is added, the whole of the new larger record will have to be typed.

Saving the relationship as a Queryfile is more flexible. Records can be added and deleted as required within the two original databases. Double clicking on the saved relationship's file icon will give the original query ready to be executed, but it is also possible to set additional conditions in the filter window before execution – for instance, all hotels in Tunisia or only three star hotels.

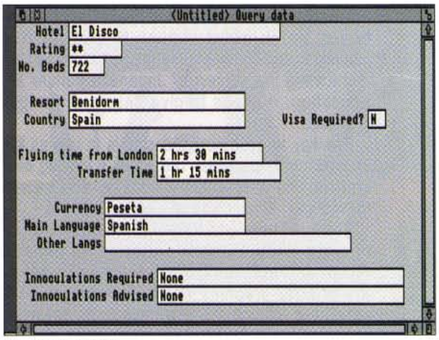
Several databases can be linked together relationally. For example a hotel database can be linked to a resort file which in turn is linked to a country database. Or the rating field in the hotel database can be linked to another file with details of the facilities expected in different types of accommodation.

● *Next month we'll look at using Pipedream 4 as a fully functional database.*


adfs::Holidays.$.Resorts * Sort order

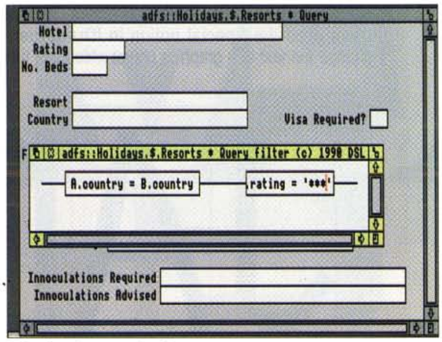
⇧ A.country	ASCII (0-9..A-Z..a-z)
⇧ A.resort	ASCII (0-9..A-Z..a-z)
⇧ A.hotel	ASCII (0-9..A-Z..a-z)

Sort order


(Untitled) Query data

Hotel El Disco
Rating **
No. Beds 722
Resort Benidorm
Country Spain
Visa Required? N
Flying time from London 2 hrs 30 mins
Transfer Time 1 hr 15 mins
Currency Peseta
Main Language Spanish
Other Langs
Innoculations Required None
Innoculations Advised None

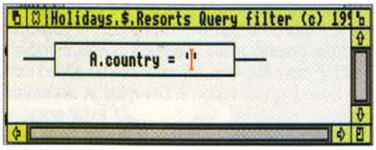
A combined view


adfs::Holidays.$.Resorts * Query
Hotel
Rating
No. Beds
Resort
Country
Visa Required?
Innoculations Required
Innoculations Advised

adfs::Holidays.$.Resorts * Query filter (c) 1990 DSL

A.country = B.country — rating = '***'

Selecting three-star hotels


Holidays.$.Resorts Query filter (c) 199

A.country = ''

The Filter Window

Applying what

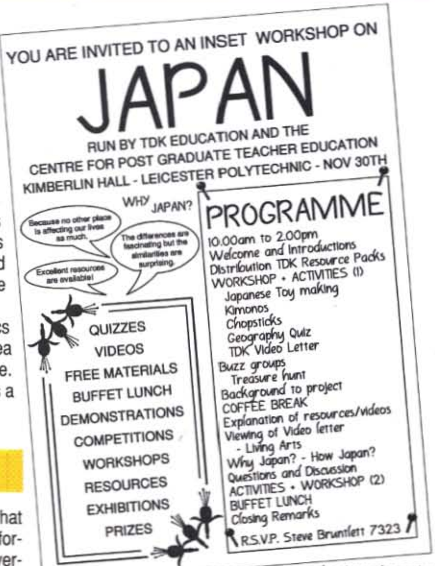
IN THE December issue we touched slightly on the public domain package, !DrawPlus, but now we are going to have a total change in emphasis. From learning the basics of !Draw we will now be using the more sophisticated !DrawPlus alongside an increasing range of drawing and text manipulation tools.

The Risc OS 3 version of !Draw – which is held in the operating system roms and always available – has much the same options as !DrawPlus as well as being able to display rotated text and graphics. Most of the comments here should apply to this new version of !Draw.

Rather than produce different types of graphics we're going to create a poster to give you an idea of the quality and style of design that's possible. You'll also get an insight into the working process a designer goes through.

First principles

A good way to get started is to decide exactly what the poster is for, who it's aimed at and what information you need to put across. This one is to advertise an INSET course about Japan aimed at teachers who would see it on a crowded staff noticeboard, be attracted enough to give it closer inspection and be tempted to apply. As well as communicating the subject of Japanese culture and education, it needs to give details of the programme.



YOU ARE INVITED TO AN INSET WORKSHOP ON

JAPAN

RUN BY TDK EDUCATION AND THE
CENTRE FOR POST GRADUATE TEACHER EDUCATION
KIMBERLIN HALL - LEICESTER POLYTECHNIC - NOV 30TH

WHY JAPAN?

Because no other place is affecting our lives as much.

The differences are fascinating but the similarities are surprising.

Excellent resources are available!

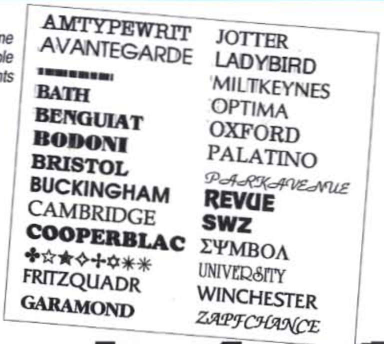
QUIZZES
VIDEOS
FREE MATERIALS
BUFFET LUNCH
DEMONSTRATIONS
COMPETITIONS
WORKSHOPS
RESOURCES
EXHIBITIONS
PRIZES

PROGRAMME

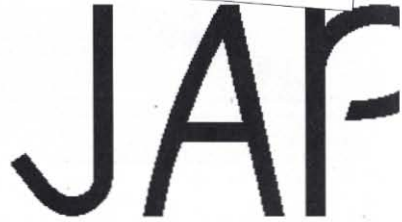
10.00am to 2.00pm
Welcome and Introductions
Distribution TDK Resource Packs
WORKSHOP • ACTIVITIES (1)
Japanese Toy making
Kimonos
Chopsticks
Geography Quiz
TDK Video Letter
Buzz groups
Treasure hunt
Background to project
COFFEE BREAK
Explanation of resources/videos
Viewing of Video letter
- Living Arts
Why Japan? - How Japan?
Questions and Discussion
ACTIVITIES • WORKSHOP (2)
BUFFET LUNCH
Closing Remarks
R.S.V.P. Steve Bruntlett 7323

Last year's poster

Some available PD Fonts



AMTYPEWRIT
AVANTEGARDE
BATH
BENGUIAT
BODONI
BRISTOL
BUCKINGHAM
CAMBRIDGE
COOPERBLAC
✣☆✱✧✢✡✳✳
FRITZQUADR
GARAMOND
JOTTER
LADYBIRD
MILTKEYNES
OPTIMA
OXFORD
PALATINO
PARKAVENUE
REVUE
SWZ
ΣΨΜΒΟΛ
UNIVERSITY
WINCHESTER
ZAPFCHANCE



Japan heading

The key to good poster design is to use as little information as possible. This stops it looking overcrowded and complicated. A good heading is useful in grabbing attention so that's where I started.

The font I used was Katyo but there are a couple of dozen similar PD fonts available from Skyfall or Arcanyia. These aren't fully hinted or scaffolded but are fine for graphics work. The main thing to remember with fonts is that three is the maximum you should use otherwise the design looks messy.

The problem with the original heading was that because of the shape of the letters the gaps are bigger between some letters than others. To avoid this I used the Special option in !DrawPlus to change the text to a graphics object which can then be treated and manipulated in different ways.

By Ungrouping the title I was able to manipulate letters individually which allowed me to close up the large gaps between J, A, P and the second A. This is called kerning and has to be done by eye, requiring the gridlock setting to be reduced to allow smaller movements for fine control using the cursor keys. It's best not to switch grid lock off altogether as it becomes difficult to line up graphics and text accurately.

Moulding text

The letters should be Grouped again so that you can treat the title as a single object, then you can start to experiment with changing the proportion or angle. Using the Line Colour, Fill Colour and Line Width options of the Path Style menu a variety of outline effects can be achieved such as the one below.

If you go mad with the line width by pushing it up to 30 it completely obliterates the letters but forms an interesting background on which to put the original outlined title in contrasting colours.

This is all very well if you intend to print in colour but this will be black and white which will give reasonable grey shades so perhaps a different strategy is called for such as using black outline only.

Other alternatives present themselves in the form of a program called Poster which allows you to drop graphics into moulds of different shapes you can create and distort them in different ways.

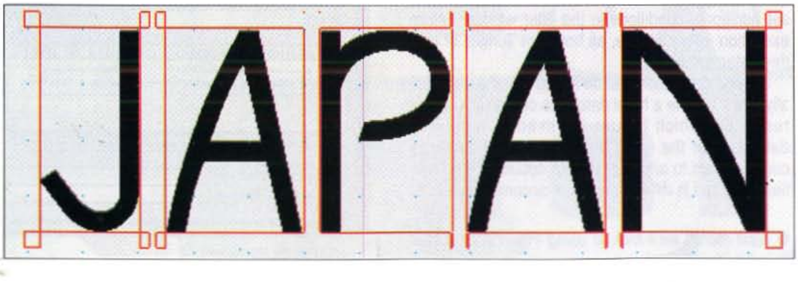
Another alternative is to use DrawBender from Ian Copestake Software which allows you to draw your own moulds using !Draw or !DrawPlus and drop your graphics into them with resulting distortion.

I thought I might use DrawBender to make the title into a flag shape. I know it's corny but I'd like to see how it works in practice. You could distort the title into a Sumo wrestler but maybe that's going a bit far ...

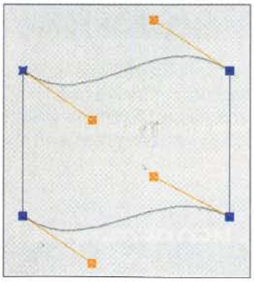
Using DrawBender is simplicity itself. Once it's loaded there are two screens to work with: The Skeleton screen where you drop your mould shape and the Full screen for your graphic. Selecting Process does the rest and leaves you with the distorted graphic which can then be saved to disc.

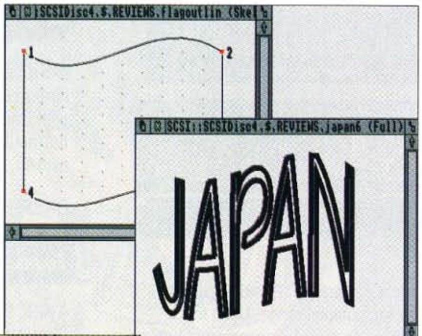
The first results were fine, but the outline was too thick. It can be adjusted in DrawPlus, but not edited, and the graphic really needed a border round it to make it more flag-like. A border can be added using the Bounding Box option in Drawplus: A useful addition.

Branches of apple blossom would have been more appropriate for the border but fuschias are

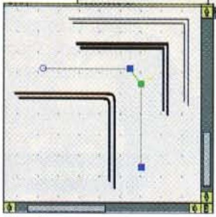


Steve Bruntlett broadens his horizons as he moves to !DrawPlus

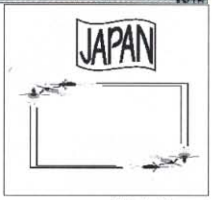



SCSIDisc4.$.REVIEWS.flagoutlin (Ske
1
2
4
SCSI::SCSIDisc4.$.REVIEWS.japan6 (Full)
JAPAN

Making the Japan flag



Creating a corner



Finished layout

you know

easier to create. There is a wide variety of clip art available from commercial and PD libraries.

To start laying out the poster use the saved drawing of the flag, add the fuschia border, increase the size of the page to A4, change its orientation to Portrait and reduced its Zoom setting so that the whole page can be seen at one glance to judge the composition and layout.

There needed to be two horizontal fuschia frames to contain the information. But simply stretching the existing border merely stretches the fuschias which is no good at all. What needs to be done is to split the fuschias from the lines forming the frame and stretch only the frame lines.

Fuschia borders

This is done by ungrouping the line art, selecting the right hand group of fuschias and moving them to the right by either dragging them or moving them with the cursor key, which takes time, but keeps them in line.

It's also a good idea at this stage to switch the paper limits on as defined by the currently loaded printer driver so that you can see exactly where the edge of the paper is when the poster is printed out.

Once the fuschias have been moved into position, using the cursor keys for fine control, the frame can be dismantled and the sections extended by repeating them across the page or by enlarging them horizontally. You could use the Transform option on the Arrange menu if you prefer to change the horizontal but not the vertical dimensions.

The rest is a matter of using the frame sections as building blocks and dragging them into position to create the new border. This can then be regrouped and repeated to give two identical frames which will hold all the information, apart from a bit across the top above the flag. This is extremely fiddly and on a simple frame it's probably better to construct your own frame borders. Especially if it only involves straight or curved lines as this frame does.

Adding the text

You can do this by using the line option to create a right angled border line. Stack a copy of this outside itself and extend the ends to overlap the inner border line. You can produce curved corners by leaving a 45° angle at the corner and alter this section in the Edit Menu by changing it to a curve. Stack a copy outside itself, extend it to overlap the inside frame section and determine the line thickness and colour with the Path Style menu.

The next stage is to type in the information. This is straightforward enough for single words or lines of text. Simply select the Text option from the Create menu and start typing.

Press Return when you have finished and you should have a line of text in 10 point Trinity Medium – the default font.

Select your text and the Text Style menu will let you alter this to any other font in any size, proportion or colour. In addition you can change the weight to Bold, Italic and so on. For blocks of text the procedure is only slightly more complicated and requires the use of !Edit which you is on your Applications disc.

Load !Edit and type what you need. Save this to disc and then drop the file on to your poster. An error message will pop up to tell you that the text doesn't have a standard header and that it will use a default one – this is fine for the moment. You should then have a small block of text in the normal kind of Select box with ears which can be used to enlarge the box to see all the text.

Tidying up

The Text Area option from the Save menu of DrawPlus allows you to save it back to disc. Load this back into !Edit to show the header created by DrawPlus. By running !Edit at the same time as !DrawPlus – multi-tasking – you can transfer the text block from one to the other without saving to disc at all.

You can edit your words to determine how the text is to be justified within the box, how many columns to use, as well as what size and font to use and at what line and paragraph spacing. Your User Guide clearly explains the process if you want more help on this.

Type in the rest of the text, decide what font and size to use and make adjustments to get a reasonable looking result. You need to print it out to see what it looks like on paper, if only to see if the text is readable and that bits of frame actually join up or if the monitor is hiding mistakes and discrepancies because of low screen resolution – which it often does.

You can avoid this to some extent by using very large zoom settings to examine frame joins and so on. Lining up text is awkward, but it can be made easier by using the gridlock and cursor keys or the ears of the select box.

Once the poster has been printed you can make minor adjustments or start again. But because you are using a graphics and text editing system you can keep the good bits and only redo what doesn't look right.

● *Next Month, more about the range of facilities available in !DrawPlus.*

P R O D U C

SOFTWARE

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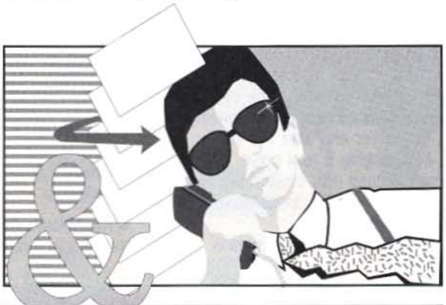

Impression Business Supplement

A set of utilities that extend and supplement Impression. This pack offers a simple mail merging facility, a new set of loaders for Word Perfect, Wordstar, Microsoft Word and a postscript utility for professional typesetting control from Impression. It even allows full (four) colour separations to be produced.

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Compression

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HARDWARE

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Not suitable for the A540.

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including SCSI £999.00 +VAT (£1173.82 incl.)

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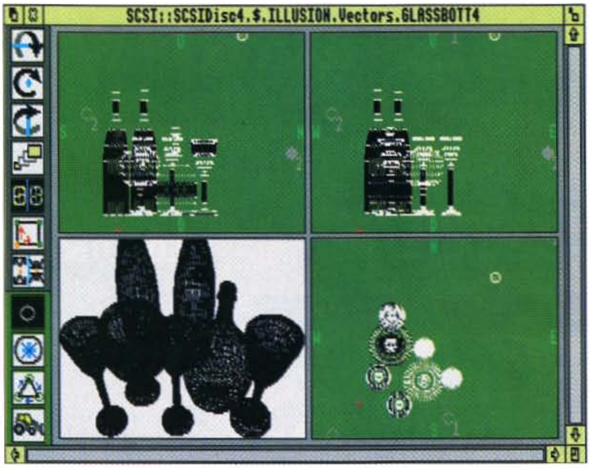
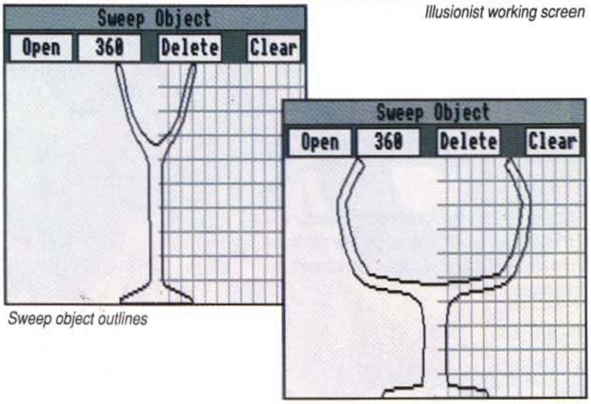
It's an illusion

Is it done with mirrors?
Steve Bruntlett lets you into the secrets of Illusionist



Illusionist working screen



Sweep object outlines

Product: Illusionist
Price: £99.95 (inc VAT)
Supplier: Clares, 98 Middlewich Road, Rudheath, Northwich CW9 7DA.
Tel: 0606 48511
Requirements: Risc OS

ILLUSIONIST is a 3D modelling system and uses the same kind of object production system as Render Bender 2. It has a similar range of tools as well as many unique ones too. Illusionist isn't just another version of Render Bender 2 though – it gives a completely different kind of image which is easier and quicker to use.

If you've used a ray tracing package before, you'll know how long it takes to produce a complex but very realistic image. Illusionist works much faster by doing calculations for each polygon and painting it directly on to the screen one at a time, rather than calculating the image pixel by pixel.

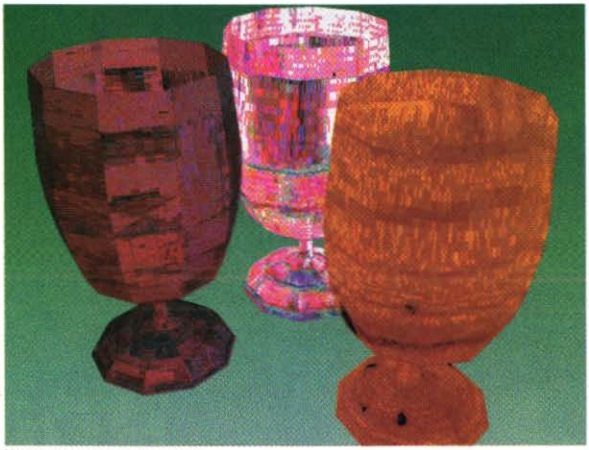
You can't have shadows or mirrored objects but you can map 16 colour Mode 12 or 256 colour Mode 13 sprites on to surfaces which can produce stunning or awful results depending on how well you do it. For example, you could start producing wooden teapots or use wood grain to enhance a sculptural image. You have to develop your own sense of when the application of a material or mapped sprite works and when it doesn't.

3D modelling systems can be used to model reality, though how successfully a computer can ever model reality is open to debate.

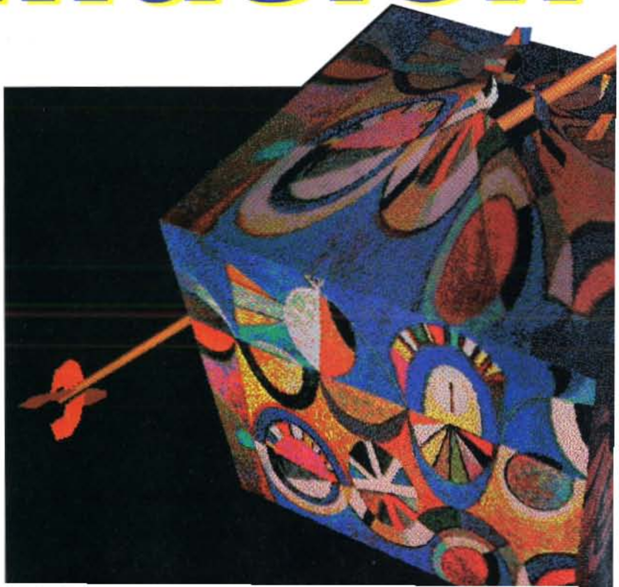
It has uses in interior and architectural design, packaging mock-ups and sculpture – limited only by the user's imagination.

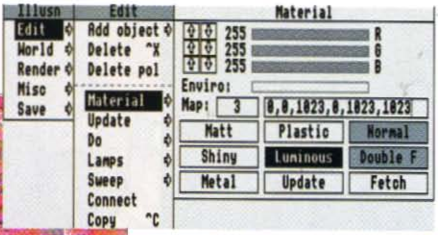
The demonstration pictures provided with Illusionist show the potential of this package and are especially good when rendered in Mode 21 and viewed on a high resolution monitor. I wouldn't say they were near photographic quality, but using the PCATS Enhancer from The Serial Port they certainly get close.

The combination of this package – and hopefully others – with the PCATS Enhancer make the Archimedes a powerful professional graphics tool comparable in quality to

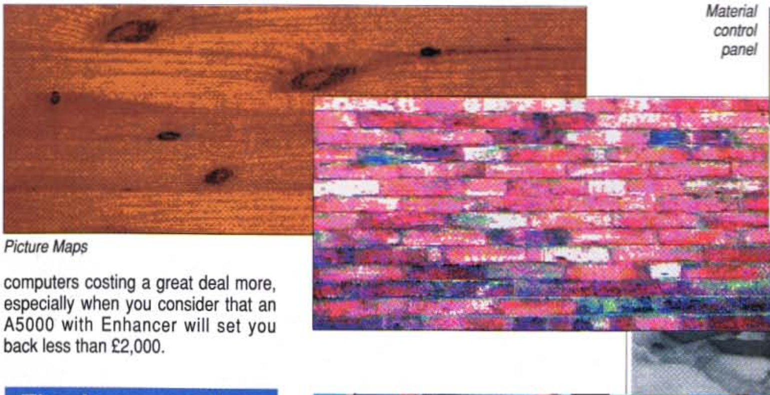


Wood, brick and marble goblets




Material control panel

255 R
255 G
255 B
Enviro:
Map: 3 0,0,1023,0,1023,1023


Picture Maps

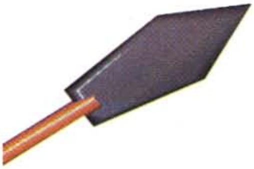
computers costing a great deal more, especially when you consider that an A5000 with Enhancer will set you back less than £2,000.

The documentation

Illusionist comes in the standard Clares wallet, which looks attractive but can get ripped in the process of removing the manual from the packaging. After the Getting Started section the manual takes you through the use of the Edit window and menus with many worked examples explaining the use of the features provided.

It's as well to go through these as they give you a clearer idea of how the features work. There are a couple of tutorials on image production and an appendix that deals with the use of the converter modules provided for use with the new Clares compression module XARC.

On the program disc you'll find sprite maps of bricks and marble in compressed form. The wood and monkey are ready to use, as are the swept and vector image files and a couple of acorns.



On Resource Disc 1 there are compressed picture files of a cup, Illusion package, kitchen scene and a train as well as vector files of a chain, an arrow bursting through a decorated box and a splash. The ReadMe file gives details about the availability of a further five discs of files and pictures which Clares will send on receipt of five blank formatted post paid discs, which is commendable.

Getting going

The Edit window has four panes which show the side, front and top as well as a wireframe view. A set of icons down the left hand side form the toolbox. This in turn allows you to rotate an object or objects round West/East, North/South and Up/Down axes. The Zoom option enlarges or reduces the scene as seen in three panes, while the Select all option is used for selecting objects or part of them.

Join selects facets joined to a particular point to make naming of objects easier. If you don't manage to select all the points on an object before you apply a material, parts of it rendered without a material can look odd, interesting or terrible. If you try moving an object with only a few points selected you can get very interesting results.

Scale allows you to enlarge or reduce objects by a definable amount. The Plant cursor is used to move Target and Object points for viewing as well as positioning new and rotating existing objects. The Selector cursor is used for selecting points on a particular polygon for treatment with a material, and for stretching or identifying objects to be named.

Naming objects as you create them makes them easier to select and manipulate or treat later in the rendering process.

The Polygon maker produces your own shapes with up to 32 sides. Finally Mover is used to move selected points or objects.

There is a series of five menus and associated sub-menus which I won't go through in detail but these are to do with Editing the objects, allowing you to add objects and lamps and make selections from the materials control panel. You can add objects to the scene from a list of regular and non-regular geometric solids. You can also add swept objects such as bottles and glasses.

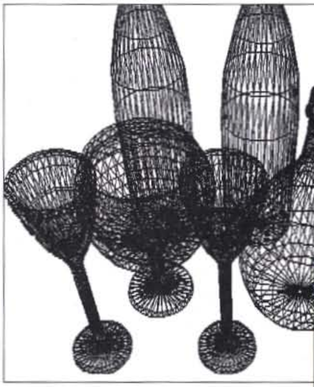
This is the option I spent most time with and it works perfectly well. There are plenty of files on the discs for you to experiment with and get an idea of how to produce your own shapes.

You need to take care with two things though. One is to set the number of steps you want to rotate through before you add a swept object, otherwise you only get the standard 10 steps which looks a bit crude. The other thing is to make sure that if you only have a single line glass or bottle outline, you have Double Faced set on the materials menu, otherwise you can only see the parts of the rendered image facing you.

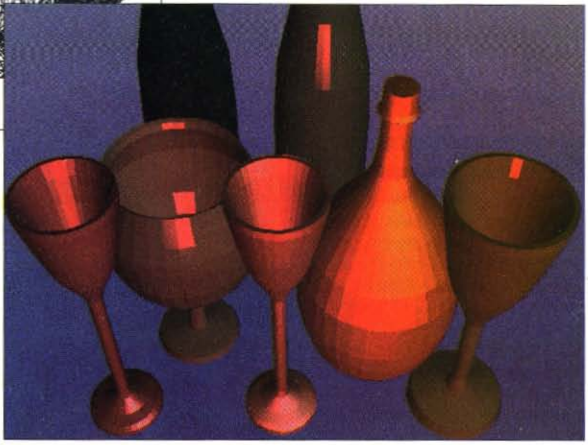
If you draw things with a double skin you should have no problem. One final thing to bear in mind is that finished swept objects are only as smooth vertically as the number of points you used to draw the outline shape with. If you want a glass to look really smooth horizontally, use a large step number. If you want it to look smooth vertically use lots of short lines when drawing curves on the Sweep Object editor.

The other thing you have to bear in mind when using such large step ➤

Mini test working and rendering scenes



Wireframe drawing of still life



The final version

➤

numbers is the amount of memory they consume. The vector file for the four glasses and three bottles is 992k – too big to fit on a disc.

Mapping sprites on to objects is straightforward but needs some experimentation to create the best effect. I tried wrapping marble, wood and brick scanned colour sprites round some crude glasses. The bottoms were fine round the stems, but the sprite was too spread out round the top of the glass.

The possibilities for sprite mapping are endless. You can produce patterned effects by selecting the number of times a sprite map is repeated. Or you can map sprite maps on to different polygons of the object and if you have black elements in the sprite map these can be turned off to allow you to see through the surface.

The Material control panel allows you to select from the loaded picture maps what proportion is mapped on to an object, adjusting the colour of an object using RGB sliders and selecting from Matt, Shiny, Metal, Plastic, Luminous and Normal material effects. There is also a Fetch facility to transfer Material information from one object to another and an option to set single or double faced polygons depending on whether or not you need to see the other side of what you've drawn.

The Magnet option allows you to pull away any points selected from the body of the object. This sounds very useful for anyone wanting to use Illusionist for 'sculpture' and is best seen in the Coke can demo that's been around since the last BETT show – which also indicates how long this program has been in development.

You can have up to 14 different coloured lamps of two types and at different distances and spread. You can edit the World of the scene selecting Observer and Target points, the Tilt of the camera, the x/y ratio of the scene, the View angle for telephoto or wide angle effects, the Exposure to control brightness, the Ambience to determine the amount of reflected light, using set colours for the Environment and setting black to be transparent. Picture maps, Labels and Cursor position windows can be popped up at any time making the system very easy to use.

Rendering

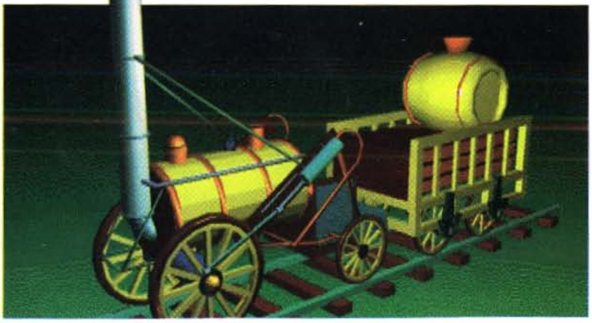
Rendering instructions are easy to follow. The menu allows you to do mini tests or see the full wire frame drawing. The screen mode can be selected from any 256 colour mode with 13 as the default. Using this mode takes only a few minutes to render a scene while Mode 21 takes four times as long.

The length of rendering time is also affected by the other Render menu options. Screen off turns off the screen which makes processing faster. Multi-task makes it slower but allows you to write reviews at the same time.

Closest fit provides a better algorithm for closer colour matching but slows down the process. Anti-aliasing smoothes pictures but takes four times longer to do. From the differences I saw I didn't think it was worth the extra amount of time involved. The scenes can also be drawn with the user determined Environment on or off.

Scenes can be saved as Vector files which contain all the information necessary to produce the rendered scene. Scenes can be saved as Draw files which can be loaded into Draw or DrawPlus and printed out or used as the basis for further work. Sweep designs can also be saved and reloaded.

Once the scene has been processed into a picture it can be saved as either a sprite, as a compressed file using Clares' XARC compression program and be loaded into Pro-Artisan or as a Clear format file which allows it to be used with Creator and Translator. The vector file can also be saved as a 24-bit file.



Summing up

Easier to use than Render Bender II, Illusionist produces a different kind of high quality image especially at higher resolution modes. A lot faster and as a result easier to use.

There is room for improvements such as being able to render quarter screen size pictures or being able to toggle full screen edit 'panes'. I think you also need to be able to specify the number of vertical points in a Sweep object or be able to set a Smooth option for Sweep objects as you can for polygons.

Having said that, the whole package is really well presented, it's enjoyable to use, it works very well, the price is reasonable and it's well backed up in terms of additional files, pictures and a competition if you're keen.

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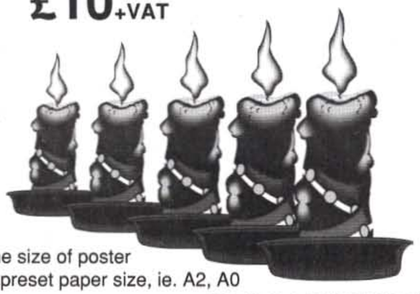

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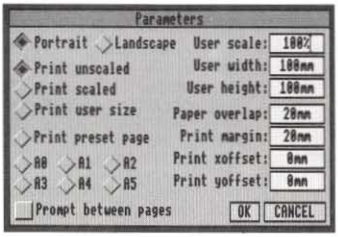

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● Portrait ○ Landscape

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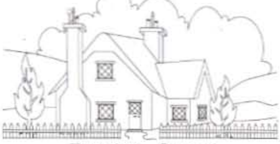

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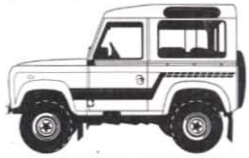

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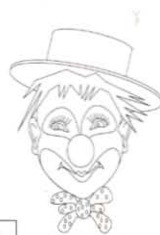

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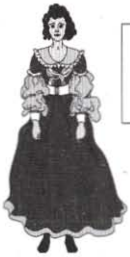

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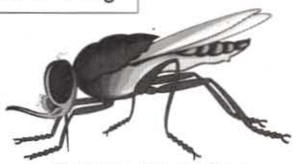

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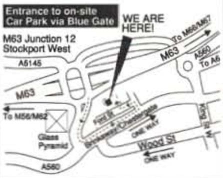

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• A3000 User Port/Midi Upgrade Card	£44
• A3000 User/Analogue/IIC I/O Card	£42
• A3000 External Podule Case	£13

VISA

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

NEW LAUNCH

After months of secret research, Watford are to launch their NEW revolutionary product to combine the success of Archimedes with the popularity of the IBM PC. We shall be demonstrating it on stand no. R10B at the January 1992 BETT show at the Barbican Exhibition Centre.

DON'T MISS THIS OPPORTUNITY

Winter Sale Archimedes A3000 Desk Top Publishing (DTP) Offer

A3000 BBC Archimedes Micro with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, COLOUR Monitor + Lead, 20Mb fast IDE Hard Disc Drive, 'Compression' Utility to increase the Hard Drive capacity to Typically 40Mb, The highly acclaimed Computer Concept's Impression Junior DTP software package.

RRP: £1299

Sale Offer Price: £849

Above Package plus Acorn's Learning Curve **£892**

Special Education discounts available on above package, micros, RAM upgrades, ARM 3 Turbo Card, etc. Please write in or telephone:

(0923) 237774/250335

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

• **R302**-A3000 – to 2MB RAM Upgrade	£39
• **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB)	£65
• **R304**-A3000 – to 4MB RAM Upgrade	£139
• **R311**-A305 – to 1MB RAM Upgrade	£30
• **R312**-A305/310 – to 2MB RAM Upgrade	£149
• **R314**-A305/310 – to 4MB RAM Upgrade	£265
• **R412**-A410/1 – to 2MB RAM Upgrade	£35
• **R413**-A420/1 – to 4MB RAM Upgrade	£64
• **R414**-A410/1 – to 4MB RAM Upgrade	£98
• **R810**-A410/1 – to 8MB RAM Upgrade	£599
• **R820**-A420/1 – to 8MB RAM Upgrade	£569
• **R840**-A440/1 – to 8MB RAM Upgrade	£499
• **R814**-R140 – to 8MB RAM Upgrade	£499

0% Finance & Special Teachers/Academics' prices Now available on A3000L/C and A5000 L/C Micro Systems

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10 – to 2MB RAM + 20MB Hard Disc	**£159**
UP15 – to 2MB RAM + 40MB Hard Disc	**£245**
UP20 – to 4MB RAM + 20MB Hard Disc	**£225**
UP30 – to 4MB RAM + 40MB Hard Disc	**£309**
UP40 – to 4MB RAM + 53MB Hard Disc	**£429**

Graphics, Art, Design & Games

GRAPHICS

ARCtist	£19
ARCticulate	£19
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£118
HotLink Presenter	£40
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Prime Art	£69
Render Bender	£58
Snippet	£21
Tween	£21

GAMES

Air Supremacy	£20
Apocalypse	£15
Arcade Soccer	£15
Boogie Buggy	£19
Break 147	£19
Bug Hunter	£14
Caverns	£14
Chess 3D	£14
Chocks Away	£14
Chocks Away Extra	£14
Conqueror	£18
Cops	£14
Corruption	£18
Crisis	£21
Elite	£33
Enter the Realms	£19
Enthar Seven	£21
E-Type	£14
E-Type Designer	£13
Family Favourites	£15
Fireball 2	£19
Holed Out Designer	£13
Holed Out Golf	£13
Hostages	£15
Ibix the Viking	£14
Inter Dictor 2	£26
Iron Lord	£15
Jiglet	£25
Jigsaw	£27
Lemmings	£22
Masterbreak	£16
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United Europe	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Saloon Cars	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Super Pool	£19
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£13
Worldscape	£16

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Blowpipe	£17
Broadcaster Loader	£65
Compression (CC)	£44
Equasor	£47
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star Printers	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
QEEM 386	£59
Rainforest	£17
Revelation	£58
Rhapsody in Blue 2	£45
Show Page	£127
Speech!	£15
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46
Tracker	£39
Vox Box	£47
WorldScape	£17

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided.
P.S. A310 upgrades require a backplane and a fan.

• **3HDP** – Hard Disc Podule only	£135
• **3HD20** – 20Meg H' Disc + Podule for 310	£235
• **3HD40** – 40Meg H' Disc + Podule for 310	£345
• **3HD50** – 53Meg H' Disc + Podule for 310	£474
• **4HD20** – 20Meg Hard Disc for 410	£129
• **4HD40** – 40Meg Hard Disc for 410	£215
• **4HD50** – 53Meg Hard Disc for 410	£335
• A3000 20Meg Hard Disc + Podule	£299
• A3000 40Meg Hard Disc + Podule	£429

For Archimedes IDE Hard Disc turn to page 14

Desk Top Publisher

Acorn's Archi DTP Package	£108
Equasor	£39
Impression 2 DTP Pack	£130
Impression Junior	£72
Expression-PS	£19
Tempest DTP Package	£90

More Archimedes Products
See Pages 3, 5, 6, 8, 10, 14

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasiWord	£18

Databases

AlphaBase	£36	Magpie	£40
Knowledge Organiser	£42	Multistore v2.01	£185

Spreadsheets

Intersheet Disc	£24	Schema	£89
Viewsheet	£45		

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

• Logistix	£79	• Pipedream 4	£149

- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £75

A3000 I/O Card
(User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features
- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. **£15**

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Professional			£275
Realtime Solids Modeller			£136

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

• A300/A3000	£21	• A400	£25

Watch this space for our Low Cost – High Performance 4Mb and 8Mb RAM Upgrades for the A5000

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77			£77 each
Assembler; LISP; Prolog X			£149 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

NEW

256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.

256 Grey-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3mS per line! (Twice as fast as most scanners.)
- Selectable 256/16/4 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- Five-function edge detection software, Laplace convolution matrix image enhancement, image smoothing, etc.

Special Launch Price
£185

ULTIMUM – Archimedes A3000 Podule Racking System

THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

Price: £149

Minerva's Archimedes Software

EasyWord	£18	Mailshot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	£59		

System Delta Program Reference Manual **£29**
** Requires System Delta to operate*

Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management
£79 per module
or Complete Business Package **£325**

ARM 3 Turbo Card

Simply The Best

Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

In response to many of our customers requests, we have extended the Offer Price to 28/2/1992.

RRP £249

Offer Price £199

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

Continued→ → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below)	**£399**

FREE OFFER

A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during January

Add-Ons & Accessories

Econet Module for the Master	**£45**
Twin ROM Cartridge for Master	**£9**
Quad ROM Cartridge for Master	**£14**
Master Reference Manual I	(No VAT) **£14**
Master Reference Manual II	(No VAT) **£14**
Master Advance Ref Manual	(No VAT) **£17**
64K Upgrade Kit for B+	**£32**
Acorn 1772 DFS Kit complete	**£49**
ECONET Upgrade Kit for BBC B	**£42**
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	**£238**
Morley Teletext Adaptor with ATS Rom	**£99**
Ecolink	**£270**

Z88 Portable Micro

£179

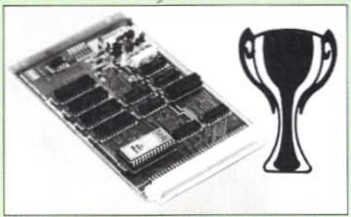
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack			**£16**
• 128K RAM Pack or 128K EPROM Pack			**£32**
• 512K RAM Pack			**£86**
• Z88 Eprom Eraser Unit			**£38**
• Z88 Spellmaster for Pipedream			**£40**
• Z88 Carrying Case			**£8**
• Z88 Computing Book			**£9.95**
• AA Nicad Rechargeable Battery			**£1.50**
• Battery Charger Compact & Fast			**£6**
• Z88 Serial Printer Cable			**£8**
• Z88 Parallel Printer Cable			**£18**
• Z88 to Archi Link			**£15**
• Z88 to BBC Link	**£8**	• Z BASE	**£56**
• Z88 to PC Link II	**£27**	• Z TAPE	**£42**
• Z88 to Macintosh	**£32**	• Z TERM	**£42**
• Z88 Mains Adaptor	**£9**	• Z88 Modem	**£114**

Archi Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £139

A Set of Colour Filters for colour image grabbing using a video camera	**£16**

Archi Graphic Tablet

The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £175

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£110**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	**£16.00**
• Watford DFS Kit complete	**£69.00**
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	**£12.00**
• DFS Manual (comprehensive)	**£6.95**
• Acorn DNFS ROM	**£17.00**
• Acorn ADFS ROM only	**£25.00**
• Acorn 1772 DFS ROM Kit	**£49.00**

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

• SPECIAL PRICE	**£44.00**
• DDFS Manual	(No VAT) **£6.95**
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• *10 x 5.25" S/S D/D 40T (744)*	***£5***
• *10 x 5.25" D/S D/D 40T (745)*	***£5***
• *10 x 5.25" S/S D/D 80 Track (746)*	***£7***
• *10 x 5.25" D/S D/D 80 Track (747)*	***£7***
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	***£9***
• *10 x 3.5" S/S D/D 40/80 Track*	***£7***
• *10 x 3.5" D/S D/D 40/80 Track*	***£7***
• *10 x 3.5" Double Sided High Density*	***£13***

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 x **M3** 3.5" D/S D/D 80 Track*	***£7***
● *10 x **M9** 3.5" D/S High Density*	***£12***
● *10 x **M4** 5.25" S/S D/D 40 Track*	***£5***
● *10 x **M5** 5.25" D/S D/D 40 Track*	***£5***
● *10 x **M7** 5.25" D/S D/D 80 Track*	***£7***
● *10 x **M8** 5.25" D/S H/D Hi-Density*	***£9***
● ***M2** 3" Double Sided*	***£2.50** each*

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.

Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

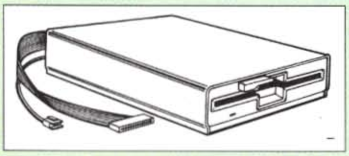
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

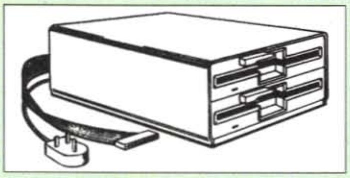
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£70**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£138**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£80**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£153**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer

- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£116** (Offer valid until stocks last)

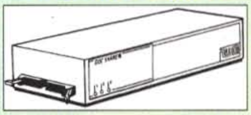
3.5" DISC DRIVE

These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	**£62**
• **CLD400S:**	Twin Disc Drives, 800K	**£109**
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	**£83**
• **CD35:**	Twin Disc Drives, 800K	**£126**

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drive Sharer

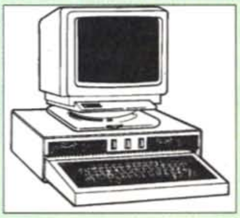


(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables **£55**

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

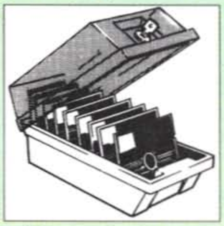
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs.

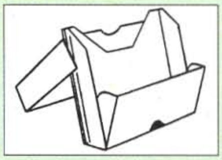
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

• **M35** – holds up to 50 5.25" discs	£4.95
• **M85** – holds up to 95 5.25" discs	£6.95
• **M25*** – holds up to 25 3.5" discs	£4.95
• **M50** – holds 50 3.5" discs	£6.50
• **M10** – holds 8 of No. 10 Data Cartridges	£15

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs.	**£1.50**
Holds up to 10 x 5.25" Discs.	**£2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£27 for 50		£49 for 100

Continued→ → → → → → → → →

Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium Resolution Monitor	£209
• **Cub3000** Medium Res for A3000	£189
• **1441** – High Resolution Monitor	£359
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 6FG	£1525
• Eizo 9070S	£579	• Taxan 770LR	£362
• NEC 3FG	£370	• Taxan 775	£362
• NEC 4FG	£465	• Taxan 795	£402
• NEC 5FG	£850	• Taxan 875	£669
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

• **BM7502** 12" Hi-res Green Monitor	£67
• **BM7522** 12" Hi-res Amber Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£165
• Dust Cover for Philips Monitors	£6

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £163

Refurbished Monitors

Philips 14" Refurbished Colour Monitors, same specification as the 'Star Buy' Monitors above £119
(Offer valid while stocks last)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

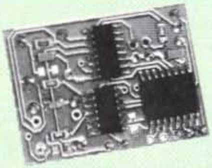
£12

Aries 2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video output. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

A bargain at £159

Watford VIDC Enhancer

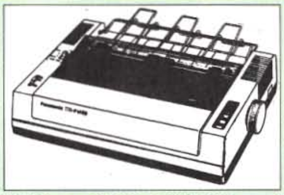


This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Panasonic Printers



• KX-P1123	£130	• KX-P1654	*£335
• KX-P1124i	£176	• KX-P1695	£274
• KX-P1170	£100	• KX-P2624	*£350
• KX-P1624	£274		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i	£79	**P37** – 1123/70/80	£69
P38 – P1624/95; P2624			£129

Buffers

P12 4K Buffer Board for KX-P1081	£55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95	£16

Serial Interfaces

P19 for P1123/24/24i/70/80/1624/54/95/2624 £49

Citizen Printers

• 120D Plus	£100	• 124D Printer	£145
• PN-48	£209	• Swift 24E	£249
• Swift 9	£145	• Swift 24X	£299
• Citizen 224	£185		

• Prodot Cut Sheet Feeder		£120
• PN48 Ribbons		£3.50
• Swift 24 Colour Option		£29
• Swift 24 Ribbons	Black £4	Colour £13
• Swift 24X Cut Sheet Feeder		£125
• Citizen/Archimedes Colour Printer Driver		£15

Integrex Colour Jet

• Colour Jet 132 Printer	£469
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£21
• Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123

Star Printers

• LC15	£173	• SJ48 Inkjet	£175
• LC20	£103	• XB24-200 Colour	£299
• LC24-10	£137	• XB24-250 Colour	£359
• LC24-15	£240	• XB24 Colour kit	£29
• LC24-200	£168	• ZA200 Colour	£236
• LC24-200 Colour	£207	• ZA250	£299
• LC200 Colour	£146		

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £55

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

Laser Printers

All Laser Printers include 12 months On-site maintenance

• Canon LBP-4+	4ppm	£575
• Canon LBP-8 III	8ppm	£970
• Canon LBP-8 IIIR	8ppm	£1445
• Canon LBP-8 IIIT	8ppm	£1345
• Epson EPL4100	6ppm	£569
• Epson EPL7500	6ppm	£1165
• HP Laserjet III	8ppm	£1015
• HP Laserjet IIID	8ppm	£1720
• HP Laserjet IIIP	4ppm	£705
• HP Laserjet IIIsi	16ppm	£2695
• Panasonic KX-P4420	8ppm*	£620
• Panasonic KX-P4450i*	11ppm*	£930
• Panasonic KX-4455 Postscript	11ppm*	£1455
• Panasonic KX-P4430 Satin Print		£POA
• Star LP-8 III 2	8ppm	£1249
• Star LP-8 III	8ppm	£915
• Star LP-8 Star(post)script	8ppm	£1149
• Star LP-4	4ppm	£565
• Star LP-4PS Postscript	4ppm	£779

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	KX-P4420/50	£19
Epson GQ	£13	Laserjet HP IIP & IIIP	£42
EPL7100	£82	Laserjet II/D, III/D	£48
Star LP-8	£56	Qume Crystal (3)	£42

Laser RAM Upgrades

• IIP & III 1MB	£56	• EPL7100 256K	£39
• IIP & III 2MB	£88	• GQ5000 512K	£42
• II & IID 1MB	£64	• KX4420/50 1M	£75
• II & IID 2MB	£99	• KX4420/50 2M	£115
• II & IID 4MB	£146	• KX4420/50 4M	£195
• Canon LBP4 1M	£105	• Star LP8 1M	£139
• Canon LBP8 2M	£125	• Star LP8 2M	£275

Laser Drum & Developer

• Epson Drum	GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum		£60	Developer	£59
• Panasonic 4450 Drum		£93	Developer	£80
• Qume Drum		£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III	£239	IID & IIID	£240

Various Add-Ons

Laserjet Appletalk Interface	£139
HP Adobe Postscript	£399
Jetpage Postscript for Laserjet 2P	£235
Jetpage Postscript for HP 2P/3	£229
Pacific Page Postscript	£259
HP Premier Font Collection	£28
Jetfont Superset for II & IID	£129
JF Superset International for IIP & III	£145

Hewlett-Packard Printers

• # Desk Jet 500	**£299**	• Paintjet XL	**£1089**
• Desk Jet 500 Col.	**£481**	• Quiet Jet Plus	**£384**
• Desk Jet Cartridge	**£14**	• HP Think Jet	**£265**
• Paint Jet Colour	**£435**		

Now 3 years extended Parts & Labour warranty

• Paintjet Cartridges Black **£19;** Colour	**£25**
• Desk Jet 500 256K RAM cartridge	**£129**
• HP Epson FX Emulation Cartridge for Desk Jet	**£59**
• Desk Jet Unlimited (Book No VAT)	**£19.75**

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£192	£43		£16
BJ300	£340	£88	£65	£12
BJ330	£385	£110	£79	£12

• Spare Battery pack for BJ10E	**£33**

NEC Pinwriter Printers

• P20	**£180**	• P70	**£425**
• P30	**£240**	• P90	**£635**
• P60	**£335**		

Cut Sheet Feeders

P20 **£59;** P30 **£75;** P60 **£85;** P70 **£129**

Epson Printers

DFX5000	**£1079**	LQ1060 Colour	**£599**
DFX8000	**£1979**	LQ1070	**£319**
FX850	**£268**	LQ1170	**£438**
FX1050	**£340**	LQ2550+	**£679**
LQ200	**£155**	LX400	**£102**
LQ450	**£172**	LX850	**£142**
LQ570	**£210**	LX1050	**£208**
LQ860 Colour	**£449**	SQ850	**£432**
LQ870	**£368**	SQ2550	**£625**

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550	**£69**
EX800/FX800/850/LQ800/850	**£130**
FX/LQ 1000/1050/SQ850	**£159**
LQ 2550 **£390** SQ2550	**£390**

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

• EX800/1000 Colour Option	**£45**
• EX800/1000 Colour Ribbon	**£14**
• LQ2500 Colour Option	**£65**
• Multifont Card for LQ550/850/1050	**£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	**£28**	RS232 + 2K Buffer	**£52**

Printer Leads

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Nimbus Centronics Lead	**£6**
IBM/Archimedes Parallel Lead 6'	**£4**
IBM/Archimedes Parallel Lead 5 metres	**£10**
IBM/Archimedes Parallel Lead 10 metres	**£15**
Double Ended 36 way Centronics Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**
IBM Keyboard extension lead coiled	**£5**

Concept Keyboards

Standard A3 Keyboard with BBC Software	**£143**
Standard A4 Keyboard with BBC Software	**£117**
Archi A3 Keyboard	**£144**
Archi A4 Keyboard	**£118**

Plotters

• HP7440A	**£415**	• HP7475A	**£592**

Roland Plotters

• DXY1100	**£495**	• DXY1200	**£625**
• DXY1300	**£825**	• DXY2500	**£2345**
• DXY3500	**£2955**	• Sketchmate	**£310**
• Roland plotter Pens, Fibre tip			**£7.50**

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	**£7**
• 2,000 Sheets 9.5" x 11" Fanfold Paper	**£11**
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	**£21**
• 1,000 Sheets 15" x 11" Fanfold Paper	**£9**
• 2,000 Sheets 15" x 11" Fanfold Paper	**£16**
• 1,000 Sheets true A4 Fanfold Paper 70gms	**£11**
• 2,000 Sheets true A4 Fanfold Paper 70gms	**£21**
• Teleprinter Roll (Econo paper)	**£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	**£6.00**
1,000 90 x 36mm (Twin Row)	**£6.25**
1,000 90 x 49mm (Twin Row)	**£7.50**
1,000 102 x 36mm (Twin Row)	**£6.75**

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	**£13.50**
3000 70 x 37mm (3 Rows)	**£13.25**
2625 70 x 42mm (3 Rows)	**£13.00**

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	–	**£3.50**
BBC Master	–	**£4.00**
Archimedes Micro pair	–	**£9.00**
Citizen 120D	**£2.75**	**£4.50**
DMP2000	**£2.75**	**£4.75**
DMP4000	**£3.75**	**£4.85**
EX800/1000	**£3.50**	**£5.00**
RX/FX80/85/800/MX80	**£2.95**	–
FX/MX/RX100/1000	**£3.95**	–
Kaga/Taxan KP810/815	**£3.25**	**£5.00**
LQ400/500/550/800/850	**£3.25**	**£6.00**
LQ1050/LQ2500	**£4.00**	–
LX80/86/800/850	**£2.75**	**£4.50**
LX400	**£3.50**	**£5.00**
M1009/GLP	**£2.95**	**£3.75**
NEC P2200	**£4.50**	**£5.00**
Panasonic KX1080/81	**£3.25**	**£4.75**
Panasonic KX-P1124	**£7.00**	**£5.00**
Star LC24-10	**£2.95**	**£6.00**
Olivetti Ink Jet Cartridges (set of 4)	**£6**	

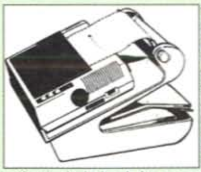
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595			**£6**
P115 for KX-P1180	**£7**	**P145** for KX-P1124	**£7**
P140 for KX-P1540	**£8**	**P155** for KX-P1624	**£8**

Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	**Serial**	**Parallel**
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 5 to 1	£16	£17

Professional Type

Connects	**Serial**	**Parallel**
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.

Parallel **£18;** Serial **£17**

(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	**Serial**	**Parallel**
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

• 2 In/2 out	**£135**	• 4 In/2 out	**£169**
• 8 In/1 out	**£199**		

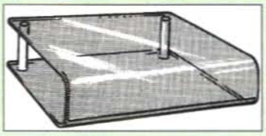
Compact Converter Units

Serial to Parallel	**£36**	Parallel to Serial	**£37**

Laser Direct

• Laser Direct Qume 6ppm complete	**£779**
• Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers	**£325**
• LPB 4 Printer plus High Res Card	**£899**
• LPB 8III Printer plus High Res Card	**£1299**

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Continued→ → → → → → → → →

QUEST MOUSE Mk III

• Quest Mouse III & Quest Paint	£59
• Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont	£89
• Quest Mouse III only	£30
• Quest Paint Software only	£34
• Quest Font Disc (22 Text Fonts)	£15
• Quest Mouse Mat (Red or Blue or Green please specify)	£3
• Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer	£18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30

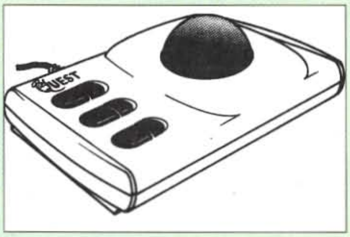
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version	£25
QT-20 Archimedes Version	£26

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£36
RB2 including Quest Paint	£69
RB2-A for Archimedes	£37

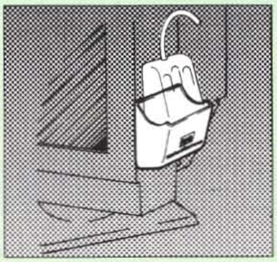
THE NEW Mk III AMX MOUSE

• AMX Mouse plus Super Art £54

(Please specify for BBC, Master or Compact)

• AMX MOUSE ONLY	£29
• AMX SUPERART Package	£29
• AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£25
• PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
• AMX DESIGN (ROM)	£34
• AMX XAM Educational	£15
• AMX EXTRA EXTRA	£16
• AMX MAX A gem of desktop (ROM)	£20
• MOUSE MAT	£3

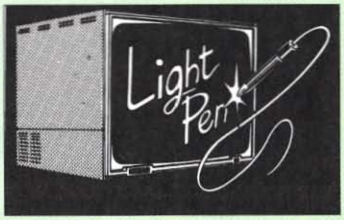
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £3



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

Fleet Street Editor

Software pack for BBC Compact	£22
Fonts N Graphics Disc Utility	£13
XTRA Admin	£12
Walt Disney	£12

BEEB VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

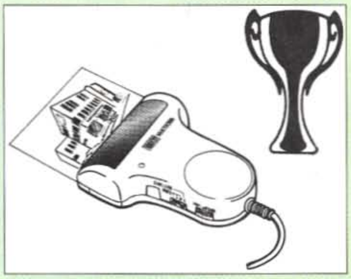
£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £125

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.
The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

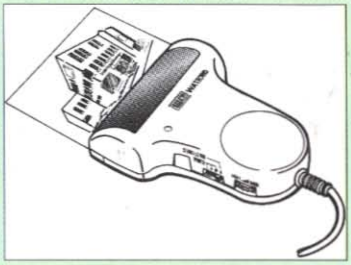
Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

(Dealers Inquiry welcome)

Computer Concept Scanlight

• Scan-Light A4	£375
• Scan-Light A4 + Sheet Feeder	£475
• Scan-Light Junior mono	£178
• Scan-Light Junior 256	£215

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

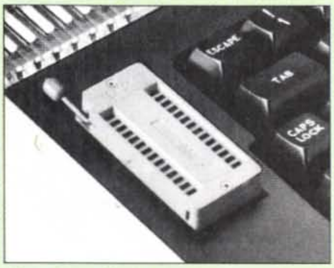
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£169**

Continued→ → → → → → → → →

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18**

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

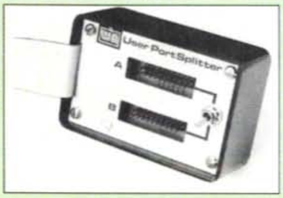
• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8;** Quad **£13**

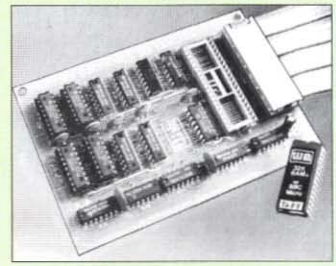
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)

NEW

Commander Joystick

Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59**

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	£36
	Aries B-12C	£5

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B

Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 £25

ROM/RAM Card

Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

- ROM/RAM card with 32k DRAM £45
- ROM/RAM card with 64k DRAM £59
- ROM/RAM card with a massive 128k DRAM £99

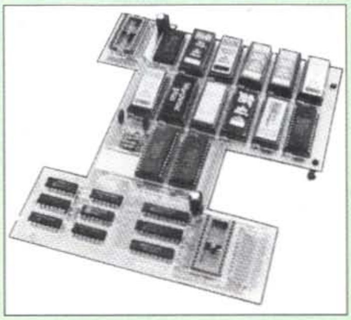
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £8
- 16k DRAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches £2 each

Complete ROM-RAM card with all options fitted £109

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card are:

- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer. **Only: £8**

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00
- POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20.00
- Computers at Work – Primary £17.35
- Introducing Geography 11-17 years £17.50
- Electric Fields 6-14 years £11.25
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- A Vous La France £29.00
- **FUN SCHOOL 2 – Red:** Under 6 yrs £12.00
- **FUN SCHOOL 2 – Green:** 6-8 yrs £12.25
- **FUN SCHOOL 2 – Blue:** 8 yrs+ . £12.50
- **FUN SCHOOL 3 – Red** £18.50
- **FUN SCHOOL 3 – Green** £18.50
- **FUN SCHOOL 3 – Blue** £18.50
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages £26
- An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years £26
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years £22
- PUNCMAN Learning punctuation
  - Puncman 1 & 2 for 7 – 13 years £15
  - Puncman 3 & 4 for 8 – 14 years £15
  - Puncman 5 & 6 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Pirate – Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years) £18

Archimedes Software

- Animated Alphabet (3-6 yrs) £21
- Arcventure (8-12 yrs) £29
- Bookbinder £43
- Bumper Disc £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Christmas Allsorts – Clip Art (6-16 yrs) £16
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigiSim £35
- Dream Time (5-7 yrs) £23
- Droom £19
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 2A Red (up to 6 years) £12
- Fun School 2A Green (6-8 years) £14
- Fun School 2A Blue (8 years +) £14
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jiglet £27
- Jigsaw £28
- Mapventure (9-13 yrs) £24
- Microbugs £24
- Money Matters £16
- Nature Park Adventure (7-9 yrs) £27
- Numerator £60
- Picture Book £16
- Recall (6-13 yrs) £39
- Sellardore Tales £24
- Snippet £26
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) £22
- Target Maths £16
- Viewpoints (9-12 yrs) £33
- Wizard's Revenge (7-10 yrs) £17
- Worst Witch (7-10 yrs) £25

Continued→ → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell with 80 track disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Overview packs 1 & 2	£65
Hi-View	£38

MINI OFFICE II

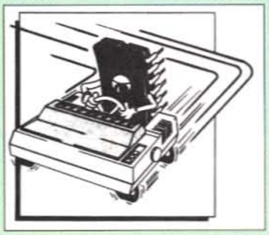
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29

CREDIT CARD
24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

OFFICE MASTER

CentreSoft
PRESENTS
Office Master

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

CentreSoft
PRESENTS
Office Mate

- ● DATABASE
- ● BEEBCALC SPREADSHEET
- ● BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

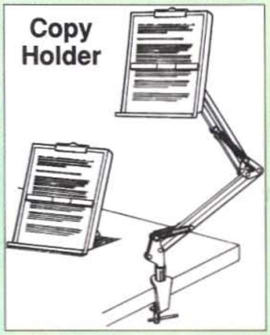
BEEBPLOT – Provides visual representation from Spreadsheet data.

Only £10 (Disc)

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£8** (carr. £3)
Angle poise **£12** (carr. £3)

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

ALL PRICES EXCLUDE VAT

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15 Hr Wordprocessing BBC/View	£6.95
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Carriage on Books vary between £2 to £4.00, depending on their weight

New Release

ACORN TO PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.
Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.
A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: **£14.95** (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.
Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's.
Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

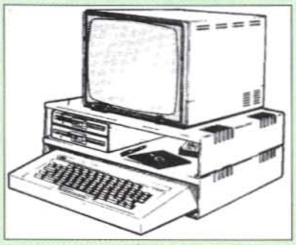
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual.
(Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued→ → → → → →

Plinths for the BBC B & Master 128K Micros



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

ADDER

The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£55 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER EB** – Standard version erases up to 16 chips. **£34**
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£36**
- Spare UV tubes. **£12**

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

VISA

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces.

£2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. **£3**

Spares for BBC Micro

UHF Modulator	**£4**	16MHz Crystal	**£2**
Speaker Grill	**£1**	17.734 MHz Xtal	**£2**
Speaker	**£3**	32.768MHz Xtal	**£1**
Keyswitch	**£1.50**	BBC B Refurbish	
Master PSU	**£59**	Casing	**£25**
Master Keyboard	**£62**	Keyboard	**£46**
Master Casing	**£49**	Power Supply	**£59**

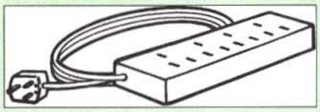
Replacement Flexible 17 way Keyboard Connector **£4**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

£16

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

Metal Chip Extractor **£3**

28pin DIL Header Plug

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

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28 pin ZIF SOCKET (Textool) **£6.95**

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	**£2.50**
to 7 pin DIN Plug	**£3.00**
to 3 Jack Plugs	**£2.50**
6 pin DIN to 6 pin DIN Plug (RGB)	**£3.00**

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK **£8**

CHIP SHOP

1 MB-10 DIL D-RAM	**£4.50**
1 MB ZIP D-RAM	**£4.90**
256K x 4-8 DIP	**£4.75**
256K x 4-8 ZIP	**£4.80**
DS3691	**£4.50**
DS88LS120	**£5.25**
LM324	**£0.45**
SN76489	**£5.50**
SAA5050	**£8.75**
UPD7002	**£6.00**
2764-250nS	**£3.00**
27128A-250nS (12V5)	**£2.50**
27128-250nS (21V)	**£4.00**
27256-2	**£3.00**
27512-2	**£4.50**
27C101G (1 Meg)	**£7.00**
4013	**75p**
4020	**£1.00**
4164-10	**£1.55**
4464-10	**£3.50**
4816 RAM	**£2.00**
41256-8	**£2.00**
41256-10	**£1.50**
6264LP-8K	**£4.00**
6502A CPU	**£5.00**
65C02 3M	**£9.75**
65C12	**£9.00**
6512A	**£10.00**
6522	**£4.00**
6522A	**£5.00**
62256ALS-15	**£10.00**
62256P-12	**£8.50**
6818	**£4.00**
6845SP	**£6.00**
68B50	**£2.95**
68B54	**£7.50**
7438	**50p**
74LS00	**50p**
74LS04	**50p**
74LS10	**50p**
74LS123	**£1.00**
74LS163	**£1.00**
74LS244	**£1.00**
74LS245	**£1.00**
74ALS245	**£2.75**
74LS373	**£1.00**
74LS393	**£1.00**
75453	**£1.00**
75159	**£3.00**
9637	**£2.00**
ICL7673PA	**£3.00**

Assorted ROMS

ACORN ADFS	**£25**
ACORN BASIC 2 plus User Guide	**£22**
Acorn BCPL	**£42**
ACORN DNFS	**£17**
Acorn FORTH	**£32**
Acorn Graphics	**£25**
Acornsoft C Disc	**£36**
Acorn LISP	**£19**
Acorn OS B+	**£25**
Acorn OS 1.2	**£14**
Basic Editor	**£24**
BBC PCB Designer	**£49**
Beebmon	**£22**
Buffer & Backup	**£20**
Communicator	**£49**
Dump Out 3	**£25**
EPSON NLQ ROM	**£25**
Graphics Extension Rom	
GXR-B	**£21**
GXR-B+	**£22**
ICON Master	**£28**
Logotron LOGO	**£43**
MASTER OS ROM	**£38**
Master ULA (47)	**£15**
Master ULA (60)	**£10**
Micro Prolog	**£25**
Microtext Disc	**£46**
Microtext Rom	**£199**
NLQ DESIGNER	**£25**
Numerator – Archi	**£69**
Numerator – BBC	**£39**
Pendown ROM	**£32**
Rom Manager	**£20**
ROMIT	**£29**
SERIAL ULA	**£13**
TED	**£35**
Termulator B, B+	**£28**
Termulator Master	**£32**
Video ULA	**£14**
ULTRACALC II	**£26**
1Mb OS ROM	**£39**

NEW

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user.

Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock
*IDEUnlock
! DEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	**£249**
ADA 0530	100Mb	16mS	**£395**
ADA 0570	200Mb	15mS	**£535**
ADA 0580	330Mb	15mS	**£POA**

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 **£85**

Internal Hard Disc Drives for A3000

ADA 0700	21Mb	23mS		**★£275**
ADA 0720	44Mb	28mS	Available Soon	**£TBA**
ADA 0730	89Mb	18mS		**£TBA**

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

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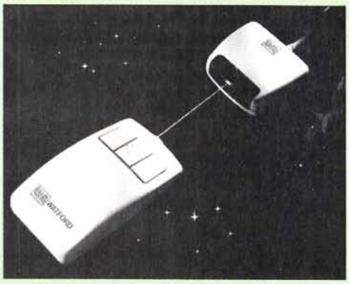

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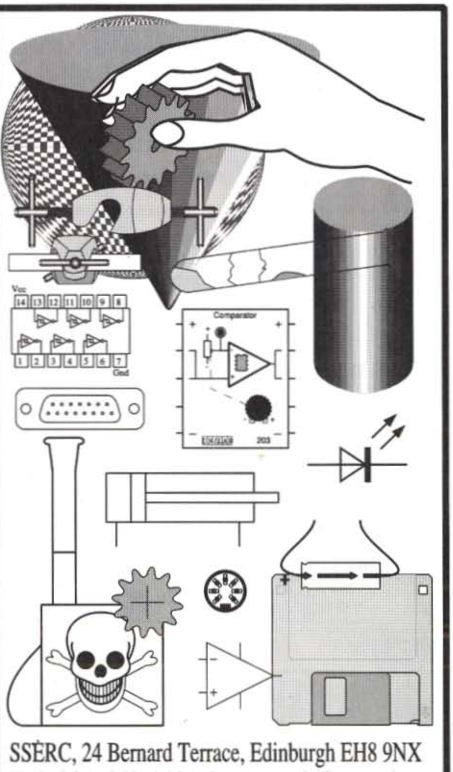

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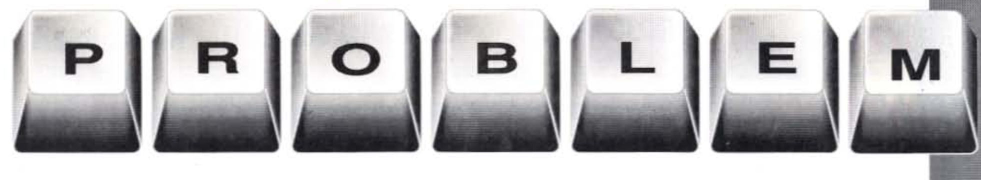

Mike Cook finds the answers to your technical questions

On the agenda...

- Grading in Elite
- Carving up ram
- Corrupting memory
- Extracting more sound
- Hardening the Arc
- Removing a disc
- On screen titlers
- Batteries flat
- Modem mystery

Elitist problems

A LITTLE while back I got myself a cheap second hand BBC B without a manual. An issue 4, it has a 1.2 operating system. I believe it originally had a DFS fitted, but this was removed before I bought it.

It runs all my software with the exception of Elite which fills the screen with garbage whenever there are lots of ships around, especially Thargoids. I can see three possible reasons for this:

- My BBC Micro is duff.
- It was not properly initialised as a true cassette-based machine when the DFS was removed and the internal links need changing
- My version of Elite won't work properly on my elderly machine.

Have you any ideas as to the problem and solution? I'd like to get hold of a cheap DFS kit and manual and perhaps I could get a disc version of Elite which would run on a single sided 40 track drive? – **Martin Wilson, Yeovil, Somerset.**

● *In the olden days there were lots of people selling disc upgrades. However, as far as I know the supply of 8271 controller chips has finally dried up – production stopped soon after the BBC Micro appeared. About the only source of disc upgrades left is Watford's DDFS.*

It could be that you have some extra roms in your computer which are taking memory away from Elite. Check by typing:

```
PRINT ~PAGE
```

For a pure cassette machine this value should be E00, anything else indicates roms that are grabbing memory. These can be removed if you don't use them. A 40 track disc version of Elite should be available from Superior Software.

Strange behaviour

MY BBC B has been doing some strange things recently. Sometimes the screen goes completely blank and I have to press Break to get out of it. All of the information in memory is wiped when you enter Old or Run and the computer says Bad program even when there is no protection. This fault is getting worse, too.

Another problem occurred shortly after this first one. When I added some extra lines to one of my programs they didn't work. The error messages reported Type mismatch and No such line. However, when I checked these they were correct.

More recently View has ceased to work. When I turn on the computer the screen goes blank with a flashing cursor on the top left. Help. – **B.J. O'Shea, Sketty, Swansea.**

● *The Bad program error is due to the memory contents being corrupted. This can happen in one of two ways: Firstly it could be due to the program going out of control or, secondly, it could be down to a hardware fault.*

The most likely cause of hardware failure is a momentary disruption of the power supply. This could be due to loosely fitting power connectors or a power supply on the blink.

If it is the program going out of control this too could have a hardware cause, the most probable being intermittent connections in the IC sockets or the keyboard connector lead.

However, the other symptoms suggest that there could be some faulty memory chips. Try running a memory diagnostic program. Watford Electronics have had one, although it's not currently advertised.

Better sounds

I HAVE seen details on how to fit a separate loudspeaker to a BBC Micro and was wondering if I could use my TV/Monitor speaker.

I have an Hitachi CPT 1646R TV/Monitor with a RGB din socket. Pin 6 marked as a sound input – nominal level 500mV/22k for 0.5w output. Could you tell me how it's done? – **T. P. Cowling, Flixton, Manchester.**

● *You can use an external loudspeaker on the BBC B by simply connecting one directly in place of the internal speaker. This gives a vast increase in both the volume and quality of sound produced.*

The sound input on your monitor can also be directly connected to the loudspeaker pins inside the computer – simply unplug the internal speaker and replace it with a lead.

However, the speaker connector closest to the centre of the board is earth and this should be connected to the earth on your RGB socket and the other wire to pin 6. If you get no sound you'll need to swap these over.

Finally, there might be too much output from the computer which will cause distortion in the sound. If this is the case fit a resistor in series with the wire going to pin 6. The value is not at all critical. Start off with a 22k and keep doubling it until you get the volume you want.

➤

Splitting ram

I HAVE a BBC Micro with Advanced 1770 DFS and a Watford 32 shadow ram board. I am sure that I have read a review which stated that it is possible to configure the shadow ram as sideways ram capable of holding rom images. If it is possible, how do you do it? – **Sue Harrison, Duffield, Derby.**

● *Some shadow ram boards are capable of providing sideways memory and others are not. For example, the Aries-B20 can only be used as a shadow ram, but the Aries-B32 is more flexible.*

*With the latter system *XON 16 will split the available memory into 16k of shadow ram and 16k of sideways ram the next time the screen mode is changed.*

*Then use the *RLOAD command to load your file into memory, having first used *RWRITE to write enable the sideways ram. After this you'll need to press Break to allow the operating system to recognise the new software. Further details can all be found in the B32 manual.*

Hard disc connection

I HAVE an Archimedes 410/1 with a single internal 3.5in disc drive to which I have recently added a 4.25 Opus 40/80 track disc drive from my old BBC system using the Watford external drive interface MK II.

In addition I have been given a Seagate hard disc ST-125-1 which I would like to fit. This drive has no casing but a steel chassis with several threaded holes for attaching it. It is of unknown parentage and there are no wiring cables. I hope that you can decipher this. – **D. Hoole, Keynsham, Bristol.**

● *Having a hard disc is only half the problem. What you need is a disc controller chip and associated circuity and then some sort of interface to connect this to your computer.*

As far as I know there are are no commercially available controller cards for the Archimedes, You can get one in the form of Acorn's hard disc podule, but I think that this comes with its own hard disc. It might be possible to fit your disc on as a second hard drive to this podule, but you would have to study its circuitry first.

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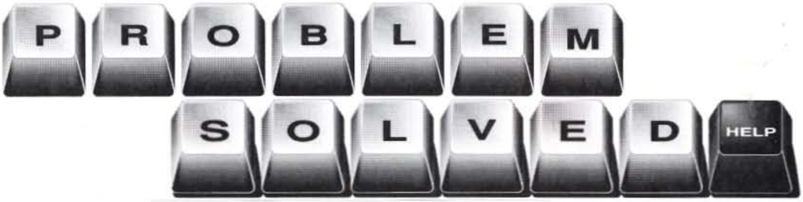
HELP



PROBLEM SOLVED

Classroom capers

WE HAVE a BBC Master at our school and just recently it has stopped working. Whenever it is switched on the display shows This is not a Language and shows a star. What is going on? – **B. Martindale, Broadway CP, Lancashire.**

● *The Master has a small amount of memory that persists even when the power is removed. This holds certain default information that the computer uses on power up, the internal battery keeping this memory powered. So first of all make sure the battery hasn't gone flat.*

*One of these pieces of information tells the computer what sideways rom socket to find its default language in. Incidentally a language can be any program like a word processor as well as well as something like Basic or Logo. A *ROMS command will bring up a list of what is in each socket. You can set the start-up language to Basic by typing:*

```
*CONFIGURE LANG 12
```

*Notice that the number for this command has to be in decimal and the *ROMS command lists the numbers in hexadecimal. That's the price you have to pay for having different people work on different parts of the operating system.*

Video titling

I AM writing in the hope that you will be able to point me in the right direction for some software for the BBC B.

As a video camera enthusiast, I was very excited when I managed to obtain a Genlock for the BBC B. However, I was unable to get any software for creating titles and graphics. I had considered trying to develop my own but divorce threatens if I spend any more time at the keyboard.

Can you recommend anything? – **Steve Vialardi, Ashford, Middlesex.**

● *There was an article on video titling in the September 1984 issue of* The Micro User *which covered this area, as well as giving some quite short programs which could be of help. There's also a titling program in the May 1989 issue.*

Modem matters

I OWN a BBC Master and have recently bought a second hand modem from a car boot sale – a Dacom, DSL 2123AD autodialling modem. But as I am new to computing, I've not got a lot of idea how to use it.

Any help on how to connect the modem and information about the software to run it would be appreciated. – **John Hickey, Greengates, Bradford.**

● *Most modems have a 25 way D-type socket on them, this is connected to the RS232 standard and should be wired up to your computer in the same way as a serial printer – it tells you all about this in the User Guide.*

Then you'll need some kind of communications software to convert your computer into what is called a glass teletype.

This piece of jargon simply means what is typed on the keyboard is sent to the serial port and what arrives on the serial port is shown on the screen. Most communications software does much more than this, such as allowing you to set the baud rate and load and download from disc files. One inexpensive package is Mini Office II, which is an integrated package that includes communications software.

I do not know what command set this modem uses to get it to autodial but the most common is the Hayes standard and this uses ATD ... , followed by the appropriate number. I hope that this gets you started in the fascinating world of computer communications. You can contact Psion-Dacom on 0908 261686.

Disc access

I HAVE recently experienced numerous disc fault problems on my BBC B. This has sometimes happened after accessing the same disc catalogue many times and could therefore be simply a disc quality problem. The last time this happened I was trying to back up.

Do you have any suggestions as to what, if any, hardware problem could cause this sort of corruption? The faults are all reported as being on track 00/00. I have been able to recover many of the programs on the disc courtesy of Steve Turnbull's Disc Rescue program. But after using the MOT program and as the problem seems to be the corruption of the catalogue, I wondered if you have ever published a catalogue repair utility? – **A.P. Cooper, Camberley, Surrey.**

● *The error at track 00/00 means that the computer has not found a valid track where it expects track zero to be. This, as you know, is the directory track and without it you don't know what is on the rest of the disc. While this can be a symptom of a bad disc, I have found that many times it is simply one of mis-alignment of the disc in the drive particularly if it's happening to a lot of discs.*

When you insert the disc and close the door, the drive mechanism grips around the hole in the centre of the disc.

However, sometimes it can be gripped slightly off centre and so instead of seeing a consistent track zero, the track wobbles in and out of the read head. This problem becomes more common as the moving parts of the drive wear out.

*In many cases the solution is quite simple. Remove the disc from the drive and then replace it, but don't close the door. Then issue a catalogue command *CAT and when the disc starts spinning close the door. This ensures that the disc is gripped centrally.*

The only problem could come when you have a misaligned disc which you format. When the disc is correctly aligned you will be unable to read it.

Therefore I make it a rule to always remove a newly formatted disc and reinsert it before writing anything to it

Structures and spaghetti

AS AN 8-bit hobbyist dabbling over the years with Basic and Assembler on Z80-based micros, I have recently acquired a BBC B. Much praised for its structured programming capability, its 6502 instruction set certainly looks attractive compared to the Z80's.

But what is one man's structure is another's spaghetti. PROCthis and PROCthat makes bug-chasing a major puzzle and this general concept seems to spill into Assembler programs too.

However, could you explain the exact way to convert a BBC B issue 3 back from disc to cassette? It appears that other links need altering, not just those around S9, IC27 and so on. – **George Payne, Watford, Hertfordshire.**

● *I strongly disagree with you here. Structured programming makes writing and debugging a program easy because the flow of the program can easily be seen. However, just because BBC Basic can produce structured programs doesn't mean that a programmer will be structured too. I think you are confusing using lots of procedures with structured programming and the two are totally different. In a structured program there is one entry and one exit point for any piece of code. Procedures can make this easier to follow but their indiscriminate use – especially with unhelpful names – can lead to difficulties. It can be difficult to find a procedure in a long listing which is why it is helpful to indent programs in such a way that a procedure definition is easy to see.*

To convert model B back to cassette you must make the link S9 and remove the DFS rom. You can remove the disc interface components too. If you have a disc controller chip fitted and the disc filing system is still in the computer, the system will hang waiting for a non-maskable interrupt that never comes because S9 is stopping it.

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Checksum know-how

Steve Turnbull tells you how to bypass errors

IT'S amazing how even copying one character differently from a listing in *The Micro User* can make the program fail. So to help you ensure that you have entered programs exactly as we print them, with each there is a list of checksums called Get it Right!

The idea is simple: Enter the listing, call the checksum generator, check the numbers displayed against those printed in the magazine and, if they don't match, correct your listing and check it again.

The listings given with this article produce short machine code programs that generate checksums. Listing I is for the 8-bit BBC Micro and can stay resident in your micro to be called when you need it. Listing II – written by Paul Dellar – is for the Archimedes series and can be called from disc whenever it is required.

So enter the appropriate listing, taking care not to make any typing errors – unfortunately you haven't got Get it Right! yet. Save the routine and run it. The code is created and saved as the new checksum generating program. The 8-bit version is run from disc just by typing:

```
*xs
```

After this you can call it again with:

```
CALL &B00
```

No disc access is needed. Tape users should load it using:

```
*LOAD xs B00
```

It is then run by entering:

```
CALL &B00
```

On the Archimedes series, the saved code should be stored in your Library directory and is run by typing:

```
*CHECK
```

To produce a printout of the checksums, enter Control+B before pressing the Return after *xs, *CHECK or the CALL. If you want the automatic paging facility use Control+N and to switch this off afterwards use Control+C and Control+O respectively. If you are using the 6502 second or coprocessor you should alter the program to run at &F600, by changing line 100 to read:

```
100 byte=&FFF4:code=&F600
```

It's used in just the same way. To call it after the first run use:

```
CALL&F600
```

So now you should be able to enter the listings published in *The Micro User* and be certain that you've typed them exactly as we've printed them.

Get it right ✓

Listing I

```
   10 REM Basic Checksum
   20 REM by Steve Turnbull
   30 REM (c) The Micro User
   40 MODE7:PROCinit
   50 PROCdeclare:PROCassemble
   60 PROCcli("SAVE xs "+STR$~code+"+200
")
   70 END
   80 DEF PROCinit
   90 newl=&FFE7:wrch=&FFEE
  100 byte=&FFF4:code=&B00
  110 rem=&F4:data=&DC
  120 return=&0D:spc=32
  130 qts=ASC"""":colon=ASC":"
  140 comma=ASC",":Lbrk=ASC"["
  150 rbrk=ASC"]":mcom=ASC"\"
  160 escflg=&FF:ENDPROC
  170 DEF PROCdeclare
  180 P%=&60:L%=2:[OPT L%
  190 .Lcrc OPT FNw:.ocrc OPT FNw
  200 .wcrc OPT FNw:.Lptr OPT FNw
  210 .Lnum OPT FNw:.LLen OPT FNb
  220 .Ltmp OPT FNb:.zflg OPT FNb
  230 .Lend OPT FNb:.qflg OPT FNb
  240 .LoNum OPT FNb:.HiNum OPT FNb
  250 .LoWork OPT FNb:.HiWrk OPT FNb
  260 .txtptr OPT FNw:.NmBase OPT FNb
  270 .crcptr OPT FNw:.codeflg OPT FNb
  280 .dataflg OPT FNb:.savebyt OPT FNb
  290 .FldSize OPT FNb:]:ENDPROC
  300 DEF FNb:P%=P%+1:=L%
  310 DEF FNw:P%=P%+2:=L%
  320 DEF PROCassemble
  330 FOR L%=0 TO 2 STEP 2
  340 P%=code:[OPT L%
  350 .check:LDA #0:STA codeflg
  360  STA ocrc:STA ocrc+1
  370  LDA #131:JSR byte
  380  STX Lptr:STY Lptr+1
  390 .start:JSR newl
  400 .while:BIT escflg:BMI escape
  410  LDY #1:LDA (Lptr),Y:BPL doline
  420 .wayout:RTS
  430 .escape:BRK:BRK
  440  EQUS "Escape":BRK
  450 .bad:BRK:BRK
  460  EQUS "Bad program":BRK
  470 .doline:LDA #0:STA Lcrc:STA Lcrc+1
  480  STA qflg:STA dataflg
  490  TAY:LDA (Lptr),Y:CMP #&0D:BNE bad
  500  INY:LDA (Lptr),Y:STA Lnum+1
  510  INY:LDA (Lptr),Y:STA Lnum
  520  INY:LDA (Lptr),Y:STA Lend
  530  JSR prescan:CPY #5
  540  BCC display:LDY #4
  550 .skipspc:LDA (Lptr),Y
  560  CMP #spc:BNE scan:INY:CPY LLen
  570  BEQ display:BNE skipspc
  580 .scan:LDA (Lptr),Y:JSR dobyte
  590  INY:CPY LLen:BCC scan
  600 .display:LDX Lnum:LDY Lnum+1
  610  JSR pdec:LDA #spc:JSR wrch
  620  LDA #ASC"=":JSR wrch:LDA #spc
  630  JSR wrch:LDX Lcrc:LDY Lcrc+1
  640  JSR phex:LDA ocrc:JSR lastchk
  650  LDY LLen:CPY Lend:BEQ newline
```

Step-by-step-guide to using checksums

Let's assume you've decided to type in a game from *The Micro User*. You've switched on your micro and the appropriate magazine is open beside it:

- **Type in about 10 lines of the program. Note that for clarity we use LISTO1 to display spaces between the line number and the actual line. You should not enter these as they waste memory.**
- **Next run whichever version of the checksum program you are using and get the checksum numbers for these first lines.**
- **A checksum consists of up to four hexadecimal digits in a group followed by a space and then a single digit called the cumulative digit.**
- **Compare the cumulative digit of the last line displayed with the equivalent digit in the checksum list printed in the magazine.**
- **If they are the same you can be fairly sure that you have made no errors so far, and you can safely type in the next few lines and repeat the check for these.**
- **When there is a difference in the cumulative digits, find the first one which differs. Either that line or perhaps the one before will contain a discrepancy between the magazine and what you have typed – the odd line out can be identified because the group of four digits listed by the program will be different to those in the magazine.**

  Common errors to watch out for are: Confusions between a lower case L and the digit one, digit zero and the capital O, or incorrect numbers of spaces between quotes and so on.
- **Once you have found and corrected any errors you should carry out the checksums for that group of lines again so you can spot any other differences.**
- **Just keep repeating the enter, checksum and correction sequence until you've typed in the whole program, which should then run correctly first time.**

Once you have become familiar and confident with the technique you can type in bigger chunks of the program before checking. In time you will be able to type in the whole program before using the checksums – but the checking method remains the same.

In the stars

Sometimes you'll find an asterisk at the end of a checksum. This means that you've added one or more unnecessary spaces at the end of the line.

The space between the line number and the actual line doesn't affect the checksum, but it should be omitted to conserve memory.

Tape users

Save the program xs as described then to use it:

```
*LOAD xs B00
CALL &B00
```

All other instructions are the same as for disc users.

SUBSCRIBE NOW

If you prefer to save the wear and tear on your fingertips you'll find this listing – together with all the others from this issue – on this month's disc, sent free if you subscribe to *The Micro User*.

```
660  LDA #ASC"*":JSR wrch
670 .newline:JSR newl
680 .update:CLC:LDA Lptr:ADC Lend
690  STA Lptr:BCC unwhile:INC Lptr+1
700 .unwhile:JMP while
710 .prescan:LDY Lend
720 .psLoop:DEY:LDA (Lptr),Y
730  CMP #spc:BEQ psLoop:INY
740  STY LLen:RTS
750 .dobyte:STA savebyt:CMP #qts
760  BNE notqe:PHA:LDA qflg
770  EOR #&FF:STA qflg:PLA
780 .notqe:BIT qflg:BMI skpcode
790  BIT codeflg:BMI jcode
800  JSR basic:JMP skpcode
810 .jcode:JSR mcode
820 .skpcode:LDA savebyt:CPY LLen
830  BEQ skipcrc:STY Ltmp:LDX Lcrc
840  LDY Lcrc+1:JSR docrc:STX Lcrc
850  STY Lcrc+1:LDX ocrc:LDY ocrc+1
860  JSR docrc:STX ocrc:STY ocrc+1
870  LDY Ltmp
880 .skipcrc:RTS
890 .basic:CMP #rem:BEQ skpline
900  CMP #data:BNE skpdata:DEC dataflg
910 .skpdata:BIT dataflg:BMI xbasic
920  CMP #Lbrk:BNE xbasic:LDA #&FF
930  STA codeflg:RTS
940 .skpline:LDY LLen
950 .xbasic:RTS
960 .mcode:CMP #mcom:BEQ skipcom
970  CMP #rbrk:BNE xmcode
980  LDA #0:STA codeflg
990 .xmcode:RTS
1000 .skipcom:LDA qflg:PHA
1010  LDA #0:STA qflg
1020 .skpLoop:INY:LDA (Lptr),Y
1030  CMP #qts:BNE skpchk:PHA
1040  LDA qflg:EOR #&FF:STA qflg:PLA
1050 .skpchk:CPY LLen:BEQ skpexit
1060  CMP #colon:BNE skpLoop:BIT qflg
1070  BMI skpLoop
1080 .skpexit:PLA:STA qflg
1090  LDA (Lptr),Y:STA savebyt:RTS
1100 .docrc:PHA:STX wcrc:STY wcrc+1
1110  EOR wcrc+1:STA wcrc+1:LDX #7
1120 .crclp:BIT wcrc+1:CLC:BPL crcskp
1130  LDA wcrc:EOR #&10:STA wcrc
1140  LDA wcrc+1:EOR #&08:STA wcrc+1
1150  SEC
1160 .crcskp:ROL wcrc:ROL wcrc+1:DEX
1170  BPL crclp:LDX wcrc:LDY wcrc+1
1180  PLA:RTS
1190 .lastchk:PHA:LDA #spc:JSR wrch
1200  PLA:AND #&0F:TAX:LDA #&FF
1210  PHA:TXA:JMP notz
1220 .pdec:LDA #10:BNE pnum
1230 .phex:LDA #16
1240 .pnum:STX LoNum:STY HiNum
1250  STA NmBase:LDA #4:STA FldSize
1260  LDA #255:STA zflg
1270 .nbit:PHA:LDA #0:STA LoWork
1280  STA HiWrk:LDX #16
1290 .next:ASL LoNum:ROL HiNum
1300  ROL LoWork:ROL HiWrk:LDA LoWork
1310  SEC:SBC NmBase:TAY:LDA HiWrk
1320  SBC #0:BCC done:INC LoNum
1330  STY LoWork:STA HiWrk
1340 .done:DEX:BNE next:LDA LoWork
```

➤

```
1350  DEC FldSize:BNE nbit
1360 .out:TAX:BNE notz:PLA:PHA:PHP
1370  TXA:PLP:BMI notz:BIT zflg
1380  BPL notz:LDA #spc:BNE digout
1390 .notz:LDX #0:STX zflg:CMP #10
1400  BCC add:ADC #6
1410 .add:ADC #48
1420 .digout:JSR wrch:PLA:BPL out
1430 .exit:RTS
1440 ]:NEXT:ENDPROC
1450 DEF PROCcli($&700):LOCALX%,Y%
1460 Y%=7:CALL&FFF7:ENDPROC
```

Listing II

```
  10 REM >$.Check/Src
  20 REM by Paul Dellar
  30 REM (c) The Micro User
  40 DIM code% &1000
  50 PROCassemble
  60 OSCLI("SAVE Check "+STR$~code%+" "
+STR$~O%)
  70 OSCLI("SETTYPE Check FFC"):END
  90 :
 100 DEF PROCassemble
 110 work_crc = 0:char      = 1
 120 loop     = 2:mask      = 3
 130 flags    = 4:total_crc= 5
 140 line_crc = 6:start     = 8
 150 end      = 9:line_len =10
 160 line_num =11:prog_ptr =12
 170 sp       =13:link      =14
 180 WriteI   =&100
 190 rem_token=&F4:data_token=&DC
 200 quoteflag=1<<30
 210 comntflag=1<<29
 220 data_flag=1<<28
 230 fieldlen =5:maxlen   =8
 240 FOR pass%=4 TO 7 STEP 2
 250 P%=0:O%=code%:[OPT pass%
 260 .checksum
 270        STMFD (sp)!,{link}
 280        MOV   prog_ptr,#&8F00
 290        MOV   total_crc,#0
 300        MOV   flags,#0
 310 .for_each_line
 320        SWI   "OS_ReadEscapeState"
 330        BCS   exit
 340        BIC   flags,flags,#data_flag
 350        BIC   flags,flags,#comntflag
 360        BIC   flags,flags,#quoteflag
 370        LDRB  char,[prog_ptr,#1]
 380        CMP   char,#&7F
 390        BGT   exit
 400        MOV   line_crc,#0
 410        LDRB  char,[prog_ptr]
 420        CMP   char,#&0D
 430        BNE   bad_prog
 440        LDRB  line_num,[prog_ptr,#1]
 450        MOV   line_num,line_num,LSL#
8
 460        LDRB  char,[prog_ptr,#2]
 470        ADD   line_num,line_num,char
 480        LDRB  line_len,[prog_ptr,#3]
 490        MOV   start,#4
 500        MOV   end,line_len
 510 .trailing_spaces
 520        CMP   end,start
 530        BEQ   leading_spaces
 540        LDRB  char,[prog_ptr,end]
 550        CMP   char,#ASC" "
 560        SUBEQ end,end,#1
 570        BEQ   trailing_spaces
 580 .leading_spaces
 590        CMP   start,end
 600        BEQ   check_loop
 610        LDRB  char,[prog_ptr,start]
 620        CMP   char,#ASC" "
 630        ADDEQ start,start,#1
 640        BEQ   leading_spaces
 650 .check_loop
 660        LDRB  char,[prog_ptr,start]
 670        CMP   char,#rem_token
 680        BEQ   no_crc
 690        CMP   char,#data_token
 700        ORREQ flags,flags,#data_flag
 710        TST   flags,#data_flag
 720        BNE   no_further_checks
 730        CMP   char,#ASC(":")
 740        BICEQ flags,flags,#comntflag
 750        TST   flags,#comntflag
 760        BNE   next_byte
 770        CMP   char,#ASC("""")
 780        EOREQ flags,flags,#quoteflag
 790        TST   flags,#quoteflag
 800        BNE   no_further_checks
 810        CMP   char,#ASC("[")
 820        ADDEQ flags,flags,#1
 830        ANDS  flags,flags,#255
 840        BEQ   no_further_checks
 850        CMP   char,#ASC("\")
 860        ORREQ flags,flags,#comntflag
 870        TST   flags,#comntflag
 880        BNE   next_byte
 890        CMP   char,#ASC("]")
 900        SUBEQ flags,flags,#1
 910 .no_further_checks
 920        MOV   work_crc,line_crc
 930        BL    crc_code
 940        MOV   line_crc,work_crc
 950        MOV   work_crc,total_crc
 960        BL    crc_code
 970        MOV   total_crc,work_crc
 980 .next_byte
 990        ADD   start,start,#1
1000        CMP   start,end
1010        BLT   check_loop
1020 .no_crc
1030        MOV   R0,#ASC(" ")
1040        MOV   loop,#8
1050        ADR   R1,print_buff
1060 .clear_lp
1070        STRB  R0,[R1,loop]
1080        SUBS  loop,loop,#1
1090        BGT   clear_lp
1100        MOV   R0,line_num
1110        MOV   R2,#maxlen
1120        SWI   "OS_BinaryToDecimal"
1130        MOV   R0,R1
1140        MOV   R1,R2
1150        RSBS  R3,R1,#fieldlen
1160        BLNE  printSpaces
1170        SWI   "OS_WriteN"
1180        SWI   WriteI+ASC(" ")
1190        SWI   WriteI+ASC("=")
1200        SWI   WriteI+ASC(" ")
1210        MOV   R0,line_crc
1220        ADR   R1,print_buff
1230        MOV   R2,#maxlen
1240        SWI   "OS_ConvertHex4"
1250        MOV   R1,#4
1260        BL    leadingSpaces
1270        SWI   "OS_WriteN"
1280        SWI   WriteI+ASC(" ")
1290        MOV   R0,total_crc
1300        ADR   R1,print_buff
1310        MOV   R2,#maxlen
1320        SWI   "OS_ConvertHex1"
1330        MOV   R1,#1
1340        SWI   "OS_WriteN"
1350        CMP   end,line_len
1360        SWINE WriteI+ASC("*")
1370        SWI   "OS_NewLine"
1380        ADD   prog_ptr,prog_ptr,line
_len
1390        LDRB  char,[prog_ptr,#1]
1400        CMP   char,#&7F
1410        BLE   for_each_line
1420 .exit
1430        LDMFD (sp)!,{pc}
1440 .bad_prog
1450        SWI   "OS_WriteS"
1460        EQUS  "Bad Program"
1470        EQUW  13
1480        ALIGN
1490        LDMFD (sp)!,{pc}
1500 .crc_code
1510        MOV   mask,#&FF
1520        ADD   mask,mask,#&FF00
1530        EOR   work_crc,work_crc,char
,LSL#8
1540        MOV   loop,#7
1550 .crc_loop
1560        TST   work_crc,#1<<15
1570        EORNE work_crc,work_crc,#&81
0
1580        MOV   work_crc,work_crc,LSL
#1
1590        ADDNE work_crc,work_crc,#1
1600        AND   work_crc,work_crc,mask
1610        SUBS  loop,loop,#1
1620        BPL   crc_loop
1630        MOV   pc,link
1640 .printSpaces
1650        STMFD (sp)!,{R0-R2,link}
1660        ADR   R0,spaces
1670        MOV   R1,R3
1680        SWI   "OS_WriteN"
1690        LDMFD (sp)!,{R0-R2,pc}
1700 .leadingSpaces
1710        STMFD (sp)!,{R0-R2,link}
1720        MOV   R1,#0
1730 .spacesLoop
1740        LDRB  R2,[R0,R1]
1750        CMP   R2,#ASC("0")
1760        BNE   spacesExit
1770        MOVEQ R2,#32
1780        STREQB R2,[R0,R1]
1790        ADD   R1,R1,#1
1800        CMP   R1,#3
1810        BNE   spacesLoop
1820 .spacesExit
1830        LDMFD (sp)!,{R0-R2,pc}
1840 .print_buff
1850        EQUS  STRING$(maxlen," ")
1860 .spaces
1870        EQUS  STRING$(fieldlen," ")
1880 ]:NEXT:ENDPROC
```

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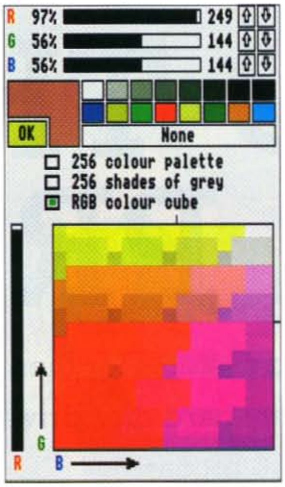
WAREHOUSE

Where else

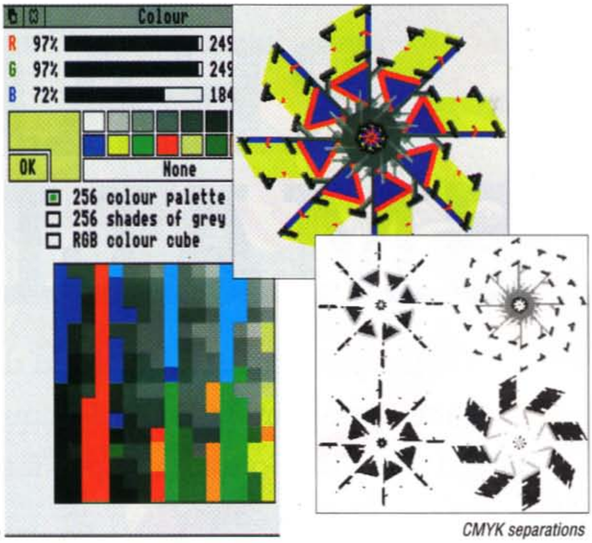
Is Chameleon the ultimate in colour utilities for the Archimedes? Steve Bruntlett reports

Product: Chameleon
Price: £25.00
Supplier: 4Mation, 14 Castle Park Road, Barnstaple, Devon, EX32 8PA.
Tel: 0271 25353
Requirements: Risc OS



R 97% 249
G 56% 144
B 56% 144
OK
None
☐ 256 colour palette
☐ 256 shades of grey
☑ RGB colour cube

Colour cube slider and cross-hairs



Colour
R 97% 24
G 97% 24
B 72% 18
OK
None
☑ 256 colour palette
☐ 256 shades of grey
☐ RGB colour cube

256 colour palette

CMYK separations

Blending into t

CHAMELEON is a very straightforward but powerful piece of software. Adding to and developing what can be done using Draw and Poster, it explodes the limits of the 256 colour palette and allows the colours of Draw, DrawPlus and Poster files to be easily changed.

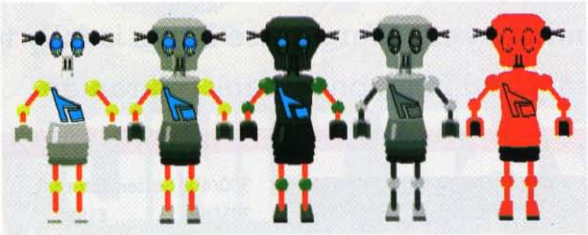
Edited files can be saved as Draw or Poster files and also as four standard colour separations or spot colour separations. It also supports the Acorn Interactive help application.

As with other 4Mation software, the price of a single copy includes a site licence – a bargain for education users. The disc is protected and involves initialisation with the owner's name and the number of the software.

This is backed up with registration details for technical support. The slim manual is the best I've seen for the Archimedes and includes very clear operating instructions, text and colour illustrations.

Any object, text or outline of fill, can have its colour changed. There are also facilities to reach even the parts you can't normally reach, either because they are so small or nested a long way down in a complex drawing.

By using Zoom and Magnification facilities as well as key aids to home in on different types of small areas Chameleon can provide user-defined palettes for 16 and 256 colour modes, a 256 grey scale as well as an RGB colour cube.



Five robots with modified colours

The attractive thing about Chameleon is that colours can be taken from other pictures, applied to the work in progress and saved for future use.

To use Chameleon simply drag a drawfile on to its icon and you're in business. Your screen will contain the Chameleon Toolbox and the drawing – possibly the help window too if you have !Help loaded.

Once you click on the Toolbox colour panel the colour menu appears. If like me you're tempted to start clicking and exploring you'll very quickly find you've lost all the colours on your drawing.

Don't worry! You can use the Undo and Redo options as many times as you like to restore or re-change the colours.

Drawfile information

Although Chameleon is very versatile there are a couple of points you have to take into consideration about what it can do: The file objects need to be ungrouped before you load them in, otherwise you won't be able to modify individual objects.

The drawings are automatically rescaled whenever you modify the size of the window. The files can be scaled by turning Full view off and then using the Zoom option or by using the Page Up, Page Down and Home keys which in turn double, halve and return the drawing to its original size. A nice touch. The Zoom option is centred on the pointer position making it easier to work on details at large zoom scales without having to search the whole drawing for the bit you're working on.

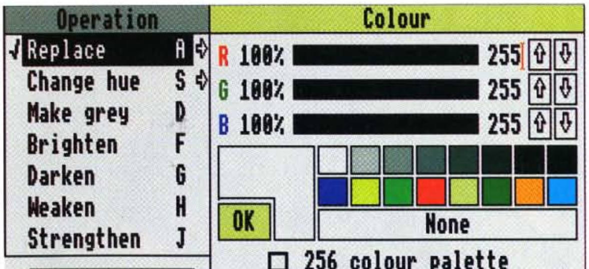
The toolbox consists of two areas: The Target area at the top controls what part of the drawing is affected. Local and global change can be either with single colours or all occurrences of a colour, while the next three require a box to be rubber-banded over part or all of the drawing by pressing Select and dragging the pointer.

The resulting red dashed outline box can be moved by selecting and dragging the ear at the top left. Its size is changed by selecting and dragging the bottom right hand ear.

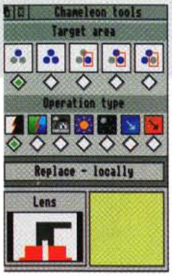
These last three options allow you to work on all objects contained wholly or partly within the Target area box. Or on objects not contained entirely within the box. It sounds complicated but it's not. These five options seem to cover every eventuality and seem a logical way of proceeding.

Using the Colour menu is straightforward involving selection of the fixed 256 colour or grey scale palette or the colour cube which is moved through with the slider at the left hand side.

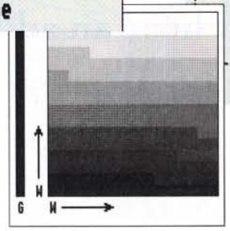
Colours can be selected from the Colour cube display panel, the cross-hair lines at the top and right indicat-


Operation
√ Replace A
Change hue S
Make grey D
Brighten F
Darken G
Weaken H
Strengthen J
Colour
R 100% 255
G 100% 255
B 100% 255
OK
None
☐ 256 colour palette
☐ 256 shades of grey
☐ RGB colour cube

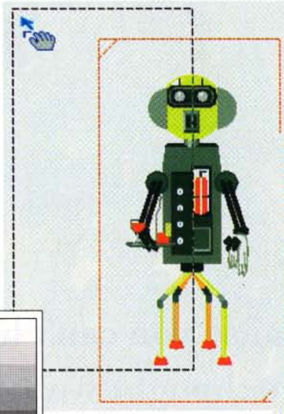
Colour operations from menu


Chameleon tools
Target area
Operation type
Replace - locally
Lens

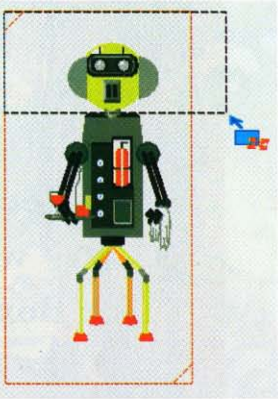
The toolbox



Greyscale colour menu showling light\normal\ dark\grey\ hue changes



Moving target area



Resizing target area

he background

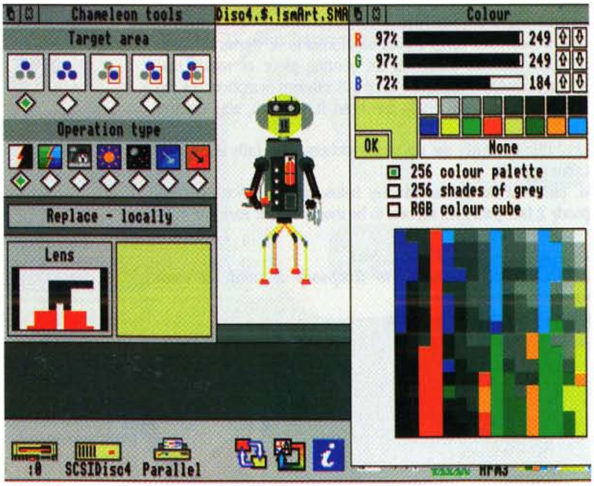
ing which colour is currently selected. Colours can also be selected by clicking on one of the 16 displayed, entering or editing the RGB values, adjusting the RGB sliders or using the up and down RGB arrows.

The seven operation types below the Target area options control how the colour is changed within the selected target area. Remember you can experiment with these as much as you like because of the Undo and Redo options. You can apply colour change operations to 256 colour sprites loaded into drawfiles which allows you to produce CMYK colour separations and up to 64 spot colour separations.

CMYK colour separations are the industry standard way of reproducing coloured images and relate to Cyan, Magenta, Yellow and Black components.

Previously this facility was only available using Expression from Computer Concepts. You can't use Undo and Redo with drawfiles containing sprites but Chameleon can be used to produce colour separations of images from paint packages which can be printed and photocopied on to acetate ready for photo-silkscreen work. This package gets better all the time.

The operation types allow you to replace the colour beneath the pointer with the current colour shown in the square at the bottom right of the toolbox. You can change the hue of the selected colour to the current colour or change it to a shade of grey. You can even change all the colours to shades of grey if you've set the Global Target area.


Chameleon tools
Target area
Operation type
Replace - locally
Lens
Disc4.$.!smArt.SMA
Colour
R 97% 249
G 97% 249
B 72% 184
OK
None
☑ 256 colour palette
☐ 256 shades of grey
☐ RGB colour cube
:0
SCSIDisc4
Parallel

Chamelion's working screen

Colour components

Brightening and darkening is achieved by increasing or decreasing the HSV value – that is the amount of black in the colour. Finally you can weaken or strengthen colours by decreasing or increasing the Saturation or the amount of white.

The manual has a very clear explanation of how colours are changed using the RGB components and how that relates to the way we see physical colours in terms of Hue, Saturation and Value. This may seem complicated but the way the authors of the program have presented colour control is very simple to use and becomes easier to understand the more you use it.

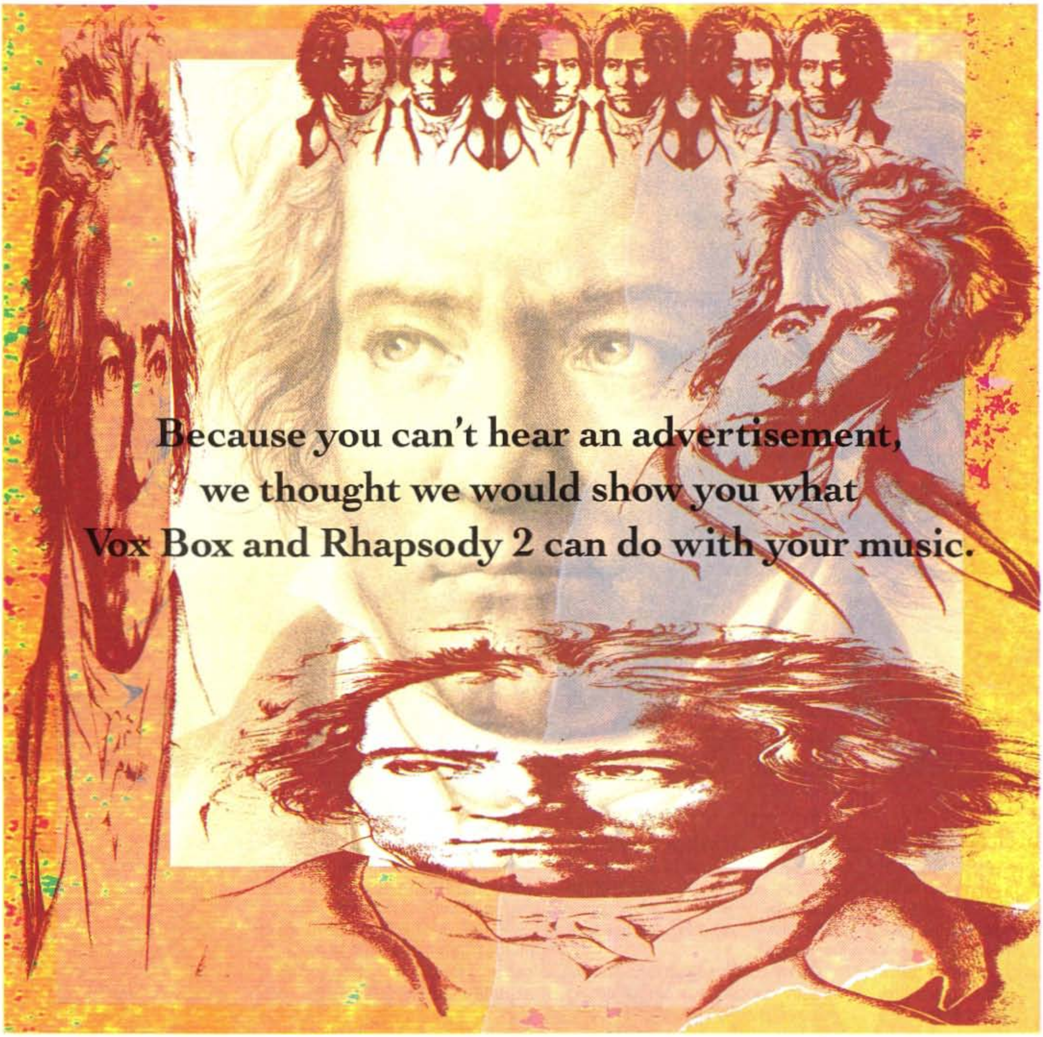
Not only can you select from a 256 colour or grey palette or from the colour cube but you can select from other drawings or part of the same drawing by clicking on a patch of colour using the Adjust button on the mouse.

This allows you to transfer colour schemes from one drawing to another though you can save your own sets of palettes for future work.

Summing up

This has to be the most useful program for graphic design since Poster. It greatly extends the colour facilities of Draw and Poster, opening up colour screen printing for anyone with a computer. It really does take colour reproduction to new heights.

Not only is this an excellent piece of software, but it shows what a superb machine the Archimedes has become and what high levels of graphic design and production are possible. And it's all available even if you have only a dot-matrix printer – eat your heart out Mac users!


Because you can't hear an advertisement,
we thought we would show you what
Vox Box and Rhapsody 2 can do with your music.

Vox Box and Rhapsody 2 really can enhance your music making. Rhapsody 2 is an improvement on the already successful Rhapsody music notation package. So, now you can do more than ever before. You can drag notes on to the score, transcribe triplets, capture notes in step time and effect MIDI program changes at the beginning or in the middle of a score. Just a few of the new and improved features that you'll discover.

Add to all that the Vox Box symphony of programs, a suite of four programs designed to compliment Rhapsody. There's Perform, which enables the user to play Rhapsody and MIDI files without the need to have Rhapsody present. Then there's Vox Beat which is primarily designed to provide facilities for a drum kit, providing a realistic accompaniment to a score. Vox Sample allows the user to convert sound samples from packages like Armadeus into useable Archimedes voices while Vox Synth will allow you to create Archimedes voices using digital synthesis.

What is more, Vox Synth allows waveforms to be drawn by hand. This means you can transform an existing piece of music into something completely different. Take a Beethoven Symphony, as the illustration suggests, you really can bend it, shape it, any way you want it.

All of this is simply the tip of the iceberg. Hopefully enough to whet your appetite.

So, please write to the address below for your Vox Box and Rhapsody 2 fact pack. It's certain to be music to your ears.

Rhapsody 2 – £61.95 inc. Vat
To upgrade from Rhapsody to Rhapsody 2 send us your original disc plus £15.50
Vox Box – £61.95 inc. Vat

10 Years

CLARES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA. Telephone: 0606 48511 Fax No: 0606 48512

Sounds simple

Rafael Jay introduces an even better sound sample player for the 8-bit BBC Micro

BACK in the August 1991 issue of *The Micro User*, we looked at the possibilities of transferring sampled sound from other machines to the BBC Micro. While all the advice on the actual sampling and transfer processes holds true, here's a further program.

Firstly, it incorporates an enhanced sample player, which not only achieves a three-fold improvement in the quality of the sound produced by your BBC Micro, but also includes a more user-friendly interface with the outside world. Secondly, there's a compression program, which greatly increases the length of sample your computer can hold.

Let's look at the Advanced Sample Player first. Type it in, use the checksums to ensure you've made no typing errors and run it. A file called *XP8* will be saved. Type *XP8, and you're ready to go.

There are one or two important differences between this sampler and the previous one. The most obvious is that the samples do not need to be converted before playing. Some conversion is still required but this is taken care of in real time by the player program itself. The second change is in the user interface.

To increase the ease with which the program can be used from Basic, a stack system has been added to the player. This means that you can tell the program where a sample is in memory and the player will store it for future use.

Furthermore, you can determine the number of samples that it takes off the stack to play – if you have stored details of 50 separate samples, you can play all 50 – opening up the potential for creating mixes – or 25 or even just one.

The entire process is controlled by a series of FX calls, which are detailed in the panel.

To place a sample on the stack, follow these steps:

- Select the speed at which you wish your sample to run, with *FX161,0,x.
- Select the type of memory in which your sample is located, with *FX161,1,x.
- Put the entry on to the stack with *FX162,x,y
- Play the chosen sample(s) using *FX163,x.

A further enhancement would be to compress the sampled information so that more could be stored in memory. But we'll take a look at that another time.

So now playing samples on your BBC Micro is easier and the quality is much, much better.

➤

Summary of *FX options

FX161,0,x	Selects the speed at which the sample is to be played, between 1 (fast) and 255 (very slow).
FX161,1,x	Selects the type of memory in which the sample is located. 0 to 15 indicates sideways ram banks 0 to 15, 64 indicates normal memory, and 128 indicates second processor memory.
FX161,2,x	Tells the program where to position the stack in memory. *x* is the address at which you wish the stack to start, rounded off to the nearest page. The default is &11.
FX161,3,x	Defines the stack length. *x* is the length you want your stack to be, rounded off to the nearest page. The default is one page. You can fit approximately 60 stack entries in one page.
FX161,4	Flush the stack. This clears the stack of all entries.
FX162,x,y	This command is used both to define the start and end of a sample in memory, and also to push it on to the stack. *x* is the start of the sample, rounded off to the nearest page, and *y* is the end of the sample, similarly rounded off.
FX163,x	Play sample(s). This command takes *x+1* samples off the stack, and plays them. For example, *FX163,2 would take the last three samples added to the stack, and play them. If the command is used without the *x* parameter, it simply takes one sample. It will stop automatically if it empties the stack.

```
10 REM X_PLAY version 8.06
20 REM By Rafael Jay
30 REM (C) The Micro User 1991
40 :
50 oldvec=&80:st=&82:stp=&84
60 stl=&86:nsta=&87
70 FOR PASS=0 TO 2 STEP 2
80 P%=&8C0:[OPT PASS
90 JSRs_init:LDA&20A:LDX&20B
100 CMP#newvec MOD&100:BNEsetvec
110 CPX#newvec DIV&100:BEQvecset
120 .setvec STAoldvec:STXoldvec+1
130 LDA#newvec MOD&100:STA&20A
140 LDA#newvec DIV&100:STA&20B
150 .vecset LDA#&00:STAst:STAstp
160 LDA#&11:STAst+1:STAstp+1
170 LDA#&01:STAstl
180 LDA#&FF:JSRpop:RTS
190 .s_init LDA#&FF:STA&FE43
200 LDA#&84:JSRto_chip
210 LDA#&00:JSRto_chip
220 LDA#&A4:JSRto_chip
230 LDA#&00:JSRto_chip
240 LDA#&C4:JSRto_chip
250 LDA#&00:JSRto_chip
260 RTS:.smp SEI:JSRs_init
270 LDA#&00:STA&70
280 LDA&75:STA&71
290 .loop1 LDY#&00
300 .loop2
310 LDA(&70),Y:NOP:JSRsound
320 INY:BNEloop2
330 INC&71:LDA&71
340 CMP&76:BNEloop1
350 LDA#&FF:JSRsound
360 CLI:RTS
370 .to_chip STA&FE4F
380 LDX#&00:STX&FE40
390 NOP:NOP:NOP:NOP
400 LDX#&08:STX&FE40
410 RTS
420 .sound TAX:TYA:PHA
430 LDA&C00,X:TAX
440 LDAtab1,X
450 STA&FE4F:LDY#&00:STY&FE40
460 NOP:NOP:NOP:NOP
470 LDY#&08:STY&FE40
480 LDAtab1+&2E,X
490 STA&FE4F:LDY#&00:STY&FE40
500 NOP:NOP:NOP:NOP
510 LDY#&08:STY&FE40
520 LDAtab1+&5C,X
530 STA&FE4F:LDY#&00:STY&FE40
540 NOP:NOP:NOP:NOP
550 LDY#&08:STY&FE40
560 LDX&74:.d_loop
570 DEX:BNEd_loop
580 PLA:TAY:RTS
590 .newvec
600 CMP#&A1:BCCexit
610 CMP#&A4:BCCact
620 .exit JMP(oldvec)
630 .act STAnsta:PHA:TXA:PHA:TYA:PHA
640 LDAnsta:CMP#&A1:BEQstats
650 CMP#&A2:BEQto_stack
660 CMP#&A3:BNEquit1:JSRplay
670 .quit LDA&F4:STA&FE30
680 PLA:TAY:PLA:TAX:PLA:PLA:PLA:RTS
690 .quit1 PLA:TAY:PLA:TAX:PLA
700 JMP(oldvec)
710 .to_stack LDAram_type:JSRpop
720 LDA&74:JSRpop
730 TXA:JSRpop:TYA:JSRpop
740 JMPquit
750 .stats CPX#&00:BNEnot_freq
760 STY&74:JMPquit
770 .not_freq CPX#&01:BNEnot_ram
780 STYram_type:JMPquit
790 .not_ram CPX#&02:BNEnot_saddr
800 LDA#&00:STAnsta:STYnsta+1
810 JSRcheck_empty:LDAnsta:STAst
820 STAstp:LDAnsta+1:STAst+1
830 STAstp+1:LDA#&FF:JSRpop:JMPquit
840 .not_saddr CPX#&03:BNEnot_slen
850 STYnsta:JSRcheck_empty
860 LDAnsta:STAstl:JMPquit
870 .not_slen CPX#&04:BNEnot_sflush
880 LDAst:STAstp:LDAst+1
890 STAstp+1:LDA#&FF:JSRpop
900 .not_sflush JMPquit
910 .check_empty
920 LDXstp:DEX:TXA:CMPst:BNEnot_empty
930 LDAst+1:CMPstp+1:BNEnot_empty
940 RTS:.not_empty BRK:EQUB&70
950 EQUS"Stack not empty":BRK
960 .pop STAnsta:TXA:PHA:TYA:PHA
970 LDXstp:BNEok1:LDAst+1
980 CLC:ADCstl:STAnsta+1
990 LDAstp+1:CMPnsta+1:BNEok1
1000 BRK:EQUB&71:EQUS"Stack full":BRK
1010 .ok1 LDAnsta:LDY#&00
1020 STA(stp),Y:INCstp:BNEskip1
1030 INCstp+1:.skip1 PLA:TAY
1040 PLA:TAX:RTS
1050 .pull LDAstp:CMPst:BNEok
1060 LDAstp+1:CMPst+1:BNEok
1070 BRK:EQUB&72:EQUS"Stack underflow"
1080 BRK:.ok DECstp:LDAstp:CMP#&FF
1090 BNEskip2:DECstp+1:.skip2
1100 LDY#&00:LDA(stp),Y:RTS
1110 .ram_type BRK
1120 .play STXcount:STYcount+1
1130 .p_loop1 JSRpull:CMP#&FF:BNEp_ok
1140 JSRpop:RTS:.p_ok STA&76
1150 JSRpull:STA&75:JSRpull
1160 STA&74:JSRpull
1170 CMP#&10:BCSnot_sram
1180 STA&FE30:.not_sram CMP#&80
1190 BNEnot_tube:JSRalt_tube
1200 JMPtube:.not_tube JSRalt_norm
1210 .tube JSRsmp:DECcount:LDAcount
1220 CMP#&FF:BNEp_loop1:DECcount+1
1230 LDAcount+1:CMP#&FF
1240 BNEp_loop1:RTS
1250 .count EQUW&00
1260 .alt_tube LDA#&AD:STAloop2
1270 LDA#&E5:STAloop2+1
1280 LDA#&FE:STAloop2+2
1290 .claim_loop LDA#&C8
1300 JSR&406:BCCclaim_loop
1310 LDA#&00:STAt_pb:LDA&75:STAt_pb+1
1320 LDA#&00:LDX#t_pb MOD&100
1330 LDY#t_pb DIV&100:JMP&406
1340 .alt_norm LDA#&B1:STAloop2
1350 LDA#&70:STAloop2+1
1360 LDA#&EA:STAloop2+2:RTS
1370 .t_pb EQUD&00
1380 .tab1
1390 ]:NEXT
1400 DIMC%(2):C%(0)=&90:C%(1)=&B0
1410 C%(2)=&D0:FORL%=0TO&2D
1420 ?(P%+L%)=C%(0)
1430 ?(P%+&2E+L%)=C%(1)
1440 ?(P%+&5C+L%)=C%(2)
1450 C%(L%MOD3)=C%(L%MOD3)+1
1460 NEXT:P%=P%+&8A
1470 P%=&CFF:FORL%=45TO0STEP-1
1480 READN%:FORK%=1TON%:?P%=L%
1490 P%=P%-1:NEXT:NEXT:P%=&D00
1500 *SAVE XP8 FFFF08C0 FFFF0D00
1510 DATA1,2,2,2,2,2,2,2,2,2,2,2
1520 DATA3,3,3,3,3,3,3,3,4,4,4
1530 DATA4,4,4,5,5,5,6,6,6,7,7,7
1540 DATA9,9,9,12,12,12,21,21,21
```

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = 9719 9
  50 = 3DFE E
  60 = 1A3A 0
  70 = C046 1
  80 = ACDA 6
  90 = A00B D
 100 = 415E 7
 110 = 5162 7
 120 = FAA4 E
 130 = 1752 B
 140 = ADF7 1
 150 = C47D 3
 160 = 53FC B
 170 = A942 C
 180 = AF76 3
 190 = 5D93 D
 200 = 877A 6
 210 = 81F4 0
 220 = A84F E
 230 = 81F4 5
 240 = 2289 2
 250 = 81F4 8
 260 = 6D76 9
 270 = 9849 9
 280 =  7EB 4
 290 = 8F91 4
 300 =  372 8
 310 = DAAE C
 320 =  3F0 1
 330 = 2E64 D
 340 = 8C3B F
 350 = 33AD 4
 360 =  188 F
 370 = 4EDA 7
 380 = B40F 0
 390 = DB0C A
 400 = FE44 7
 410 = 9843 0
 420 = 9BD9 6
 430 = 35E9 E
 440 = 5810 E
 450 = F13D 0
 460 = DB0C 8
 470 = C085 C
 480 =  65E 4
 490 = F13D 1
 500 = DB0C 2
 510 = C085 3
 520 = E5D3 8
 530 = F13D 8
 540 = DB0C E
 550 = C085 B
 560 = 7723 E
 570 = BEDF E
 580 = 8278 8
 590 = 68A4 8
 600 = DBED 2
 610 = B569 C
 620 = 1FF6 7
 630 = 6B90 A
 640 = A6EA D
 650 = 4B75 C
 660 =  C70 7
 670 = F356 B
 680 = 19EF 4
 690 = A11B E
 700 = D6CB D
 710 = 7FA3 8
 720 = C66C 2
 730 = 230A 3
 740 = 975B 7
 750 = B370 8
 760 = 1916 5
 770 = E3B7 5
 780 = 35EC 4
 790 = 7AC6 7
 800 = B9E3 2
 810 = 98F9 1
 820 = D530 F
 830 =  643 6
 840 = 6843 3
 850 = 79BE 2
 860 = 7806 0
 870 = 5E36 5
 880 = ACAA 8
 890 = 15B4 5
 900 = C912 0
 910 = C74D 6
 920 = 629A 2
 930 = 3167 4
 940 = A32E C
 950 = B8F2 6
 960 =  53C 5
 970 = B888 3
 980 = C134 B
 990 = 193D 6
1000 = 825E 0
1010 = 2AE3 0
1020 =  4A2 2
1030 = E9F2 0
1040 = 2829 3
1050 = BDD2 2
1060 = B0AA C
1070 = BF68 8
1080 = E5C9 E
1090 = 826C 0
1100 = 50FA 2
1110 = F090 5
1120 = 646B 1
1130 = E277 2
1140 = BEA9 3
1150 =  3CD 1
1160 = F132 2
1170 = 90AB 7
1180 = 9E47 A
1190 = 1512 3
1200 = E881 8
1210 = 5F75 F
1220 = 203B 9
1230 = DD08 E
1240 = C44C A
1250 = ED52 7
1260 = 5F27 9
1270 = D962 B
1280 = A214 F
1290 = B257 C
1300 = 7CC5 E
1310 = F06D 4
1320 = 2DBD 3
1330 = 747E 5
1340 = BCE4 3
1350 = 3C09 E
1360 = F548 B
1370 = 249A 1
1380 = A8F9 8
1390 = DA42 6
1400 = 5DE8 4
1410 = 92EF E
1420 = FB68 2
1430 = 966F 3
1440 = 3A83 8
1450 = D4C3 C
1460 = 6B30 1
1470 = 7657 C
1480 = 12A3 C
1490 = D7A1 4
1500 = 13D8 7
1510 = 4316 2
1520 = 9A10 C
1530 = B957 7
1540 = 5CB6 8
```

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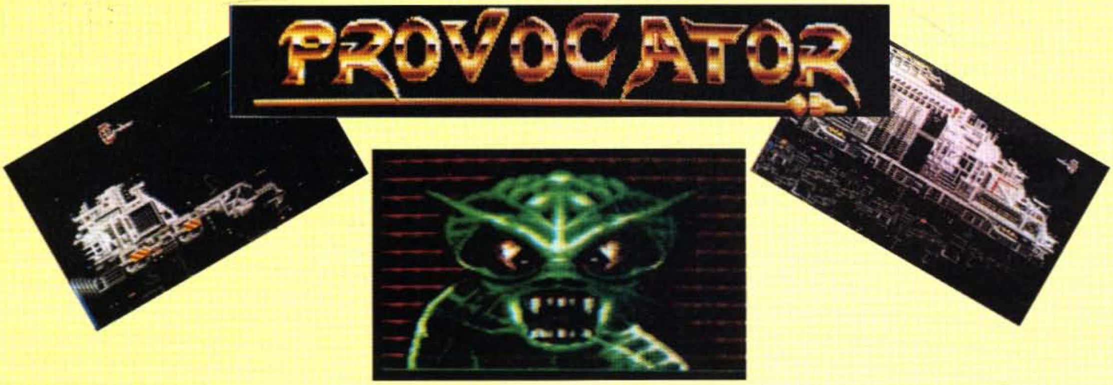

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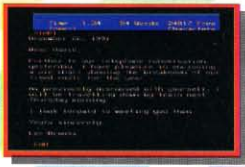

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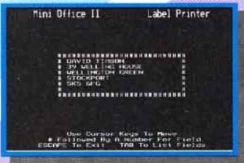

```
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          Use Cursor Keys To Move
     # Followed By A Number For Field
  ESCAPE To Exit    TAB To List Fields
```

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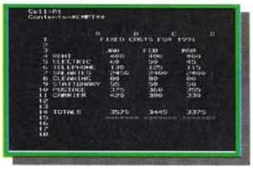

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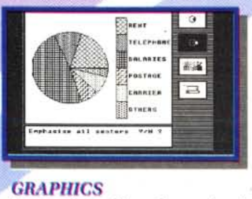

```
Emphasise all sectors   Y/N ?
```

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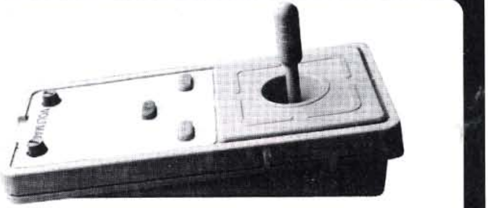

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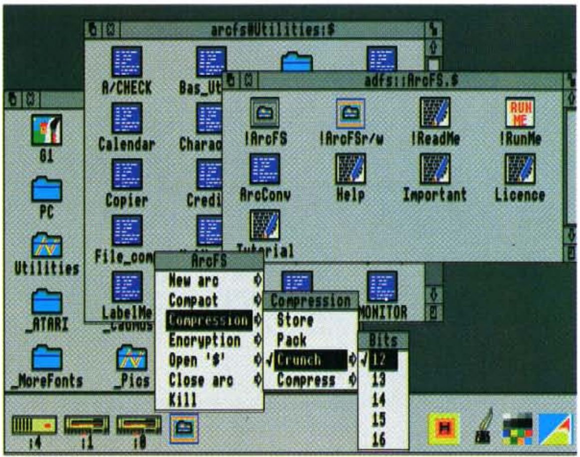
A two way squeeze

Terry Blunt compares two file compression utilities for the Archimedes



ArcFS windows and menus

Product: Compression
Price: £49
Supplier: Computer Concepts,
Gaddesden Place, Hemel
Hempstead, Herts HP2 6EX.
Tel: 0442 63933

Product: ArcFSr/w
Price: £5.99
Supplier: David Pilling, PO Box 22,
Thornton Cleveleys, Blackpool
FY5 1LR.
Tel: 0253 852806
Requirements: Risc OS

WITH the apparently continuing expansion of file sizes on the Archimedes, some form of data squeezing becomes increasingly attractive. This is particularly relevant for screenshots and sprites, although useful savings are possible on almost all file types.

ArcFSr/w from David Pilling and Compression from Computer Concepts are two file compressing utilities for the Archimedes series. Both are fully wimp driven, acting as an additional filing system layer between you and the Filer. The result is that they will operate quite happily with any filing system. However, the way each achieves this is significantly different.

Taking ArcFS first, this is a logical progression from the Spark archiving utility already familiar to many of you. Like Spark, a single file archive is used. This gives useful compression on all objects, including directories. On the downside, should your archive become corrupted it is likely that you will lose everything in it.

Using archives

On the disc with the software is a ReadMe file of instructions, along with several other text files, and a conversion utility for !Spark archives.

Using ArcFS is very easy. Double clicking on the icon, drops it on to the icon bar alongside your drive icons. You then create a new archive through the icon bar menu. This can be dragged to any open directory viewer.

Once the archive has been created – identified by a stripey folder icon – you have to actually open it before you can use it. Double clicking on it will open a normal directory viewer with the arcfs filing system combined with the archive title as a device name.

From then on all normal filer operations can be used to move files in and out of the archive, rename or copy them. ArcFS can also be chosen as the currently selected directory for random access filing operations.

Although an archive file is used, full read/write capability is supported. Wordprocessor documents can be loaded, extended and re-saved. Basic OPENIN and OPENOUT will work quite correctly, albeit a little slowly. As these filing operations can create gaps in an archive – in a similar way that the old DFS on the 8 bit BBC Micro used to – there is a compact command available from the icon bar menu. ArcFS performs all its operations in memory, so you are restricted on the file size you can work with. Even just loading a sprite file could temporarily require up to 250k of free RMA space. This depends very much on the compression method used.

Working from a single icon on the icon bar, ArcFS can have up to five archives open at the same time and these can be on different media. If the windows are closed, they can be reopened from the menu. You need to remember though that closing a window doesn't close the archive and you could run into problems if you switch off your micro, forgetting to close and update archives that have been modified.

Method selection

A particularly useful aspect of ArcFS is that it recognises a wide range of archive types. So most of your PC archives can be handled, although of course, only text files are likely to be of much use on the Archimedes. At the same time it is possible, by trial and error, to select the compression method that best suits a particular file. This is all available from the icon bar menu.

Compression, instead of using a single file archive, compresses each file individually. This means that there is an overhead for each file. Another consequence is that it is impossible to compress directories. However, keeping compressed files separate means that data corruption on the disc won't necessarily wipe out all the files.

The software, comes on a disc that has a special installation procedure. This doesn't restrict your use of the software, but gives Computer Concepts peace of mind by uniquely identifying your copy. Packaged with the disc is a detailed A5 size instruction manual.

When you load Compression on to the icon bar, as with ArcFS it sits alongside the normal drive icons. However, by default the icon is tied to drive 0.

Clicking on menu reveals a number of options, including one to define additional drives/ devices. These appear on the icon bar as they are ➤

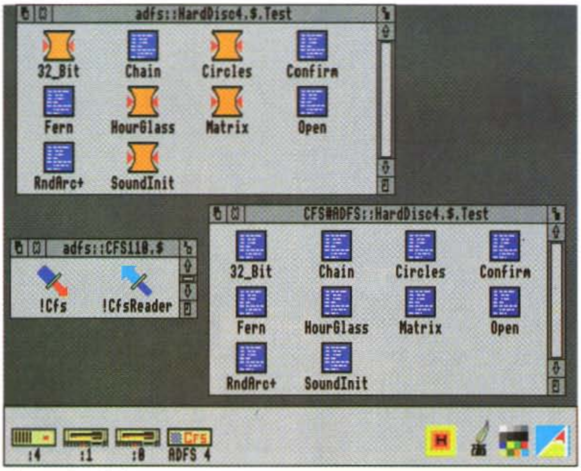
created. When you open a window from the CFS icon, the title bar is the same as the original for the drive, with the prefix cfs#. This is not too obvious at first and you can easily get mixed up as to which directory you are actually looking at.

This is partly due to one of Compression's good points – the ability to handle both compressed and uncompressed files, apparently in exactly the same way.

Once you have compressed files on your disc the difference becomes obvious. In the normal Filer window compressed files are displayed as waisted orange rectangles whatever their type, while in the CFS window they show their correct filetypes.

Compression uses a transitional file to work on, while compressing. You have control over where this file is, but it should ideally be in your !Scrap directory. If you have a hard disc very large files can be compressed, otherwise you are limited to whatever free space exists on your floppy.

A point worth watching is that if you drag a file into the compressed window that exactly matches your normal Filer window, the new file overwrites the old one. The same is true if you drag it out to decompress it. This is generally useful, but is a potential source of confusion.



Compression window

Only one compression method is used, the popular LZW. This will usually give a high compression on a wide range of file types.

To save wastage, short files are not compressed. As with ArcFS full random access filing is possible. There is no overall wastage though, as the whole file is completely re-created each time.

Both Computer Concepts and David Pilling provide a PD read-only utility that you can freely distribute with any compressed files you want to pass on to others.

Summing up

Both compressors have their strong points. Compression is probably better suited to a more or less permanent set-up on a hard disc, while ArcFS is easier to move about across different filing systems and media, provided you have plenty of memory.

Compression is probably more technically correct in the way it interacts with the Filer, but ArcFS is more intuitive.

I didn't perform detailed timings, but found that there was little to chose between the two systems.

Screen loads were almost identical. However, saving operations were quite a bit faster with Compression.

Compression can't handle foreign compressed files, but ArcFS has a few obscure bugs that can cause problems when handling older archive types.

Finally Compression is about eight times the cost of ArcFS.

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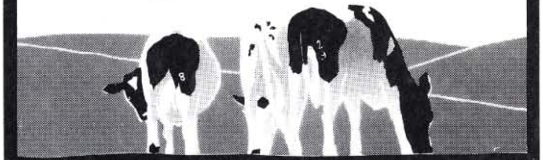

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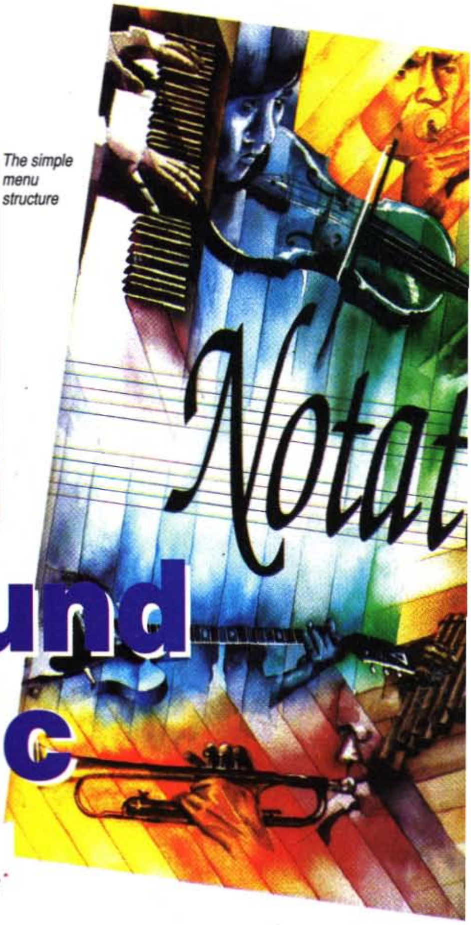
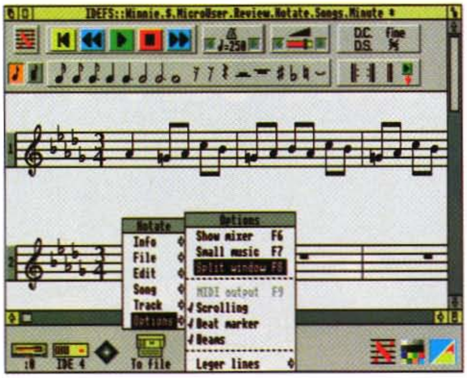


The sound of music

Steve Turnbull hums his way through a new music package



The simple menu structure

Product: Notate
Price: £59 (single user). Site licence £190 (Primary) £330 (Secondary)
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Tel: 0223 425558
Requirements: Risc OS, (1Mb may have problems when printing)

CREATING music is a popular – and fun – pastime although the formal notation used to commit it to paper is complex and can be difficult to learn. Notate by Longman Logotron is an easy-to-use application that can make the tasks of learning and writing a little easier.

Notate is supplied on two discs, the first containing the program itself, a !SysMerge application to update your !System if required, plus some sample songs and voices. The second disc just has voices on it. The rest of the packaging is up to the excellent standard expected of Longman Logotron products.

Double-clicking the application loads it on to the iconbar along with a copyright and registration window, which disappears when the mouse is next clicked. A click on the iconbar icon brings up an empty document window comprising a single stave with the preset 4/4 time and treble clef, with a tool bar across the top.

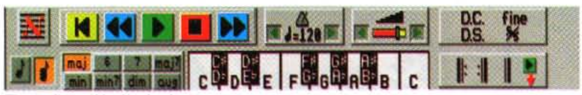
Simple menus

A simple menu structure offers just six options and each of the sub-menus has seven or fewer, which makes for a very simple user interface. The tools in the window are not duplicated within the menu structure but this isn't a problem.

Entering notes and other items is simply a click and drag operation, just point at a crotchet in the tool bar and drag it down to the stave to the position you want. In its default state the pitch of the note sounds when you drop the note. Changing its pitch is just as easy: Just drag to the new position. The note also sounds when you click it, so it's possible to get a quick reprise of a sequence just by clicking each in turn. The play note on click or on button release options can be switched off independently, as it can be annoying in some instances, but a Shift+click will sound the note in this situation.

The whole process of music entry is very easy. Rather than going back to the toolbar for every note, you can use the Adjust button to make a copy of an existing note and drag the duplicate to a new position. Deletion is just a matter of dragging the note off the window. A bar does not have to contain its full complement of notes – Notate adds the necessary rests – but it cannot, even temporarily, contain too many notes.

Selecting a portion of the text for cut, copy and paste operations is as simple as you'd expect – just drag a greyed selection box and use Control+X, Control+C or Control+V. It's so easy that repeated sequences can be built up in moments.



The toolbox with chord selector

Not only that, but selected areas can also be transposed up and down using a dialogue box, which also reminds you which key you're in. The transpose dialogue box also allows you to affect a specific stave or the whole piece.

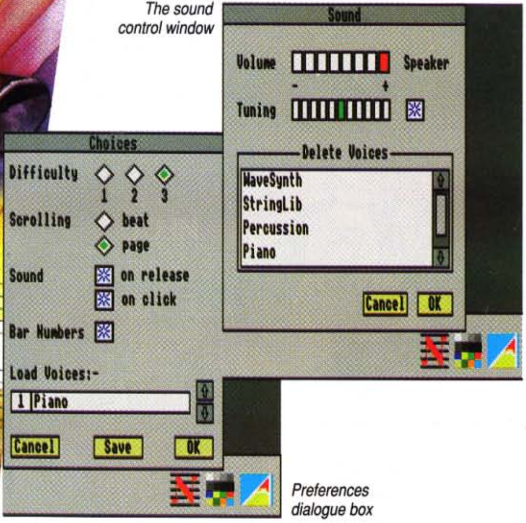
Apart from entering music on staves Notate will also let you include chords of most varieties including augmented and diminished. You can then drag the chord symbol to a bar where it will be sounded when that bar is reached. If chords are used, only four-part music can be written as the other four parts are used for the chords.

Although the chords are useful to

Music programs compared

Product	Price	Max staves	Multiple parts	Min note length	Display sizes	Display quality	Entry	Editing	Extras [0]	Printing
Notate	£59.00	8 or 4[1]	No	semiquaver	Two[2]	*****	*****	***	***	***
Rhapsody 2	£61.95	24	Yes	hemidemisemiquaver	Three[3]	***	***	***	****	***[4]
Maestro	Free	8	Yes	hemidemisemiquaver	One	**	***	****	***	n/a

[0] Extras refers to additional features that can modify a note such as trills, turns, double and triple dots and so on.
[1] Notate can also include guitar-style chords and uses four voices to do so. This limits the number of staves to four.
[2] Normal and small sizes.
[3] Normal, large and small sizes.
[4] Without additional software. Using ScoreDraw the output is very smooth.



The sound control window

Volume Speaker

Tuning ☒

Delete Voices:
- WaveSynth
- StringLib
- Percussion
- Piano

Difficulty ○ 1 ○ 2 ● 3

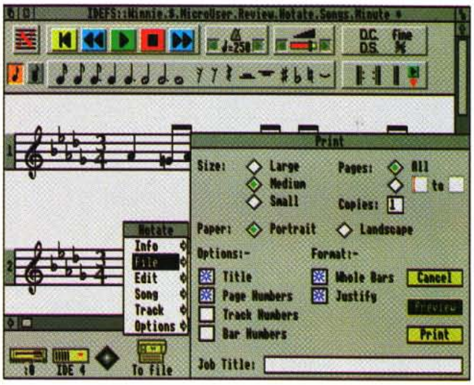
Scrolling ○ beat ● page

Sound ☒ on release ☒ on click

Bar Numbers ☒

Load Voices:- 1 Piano

Preferences dialogue box



Selecting the print options

IDEFS::Minnie.$.MicroUser.Review.Notate.Songs.Minute

Size: ○ Large ● Medium ○ Small

Pages: ● All ○ ☐ to ☐

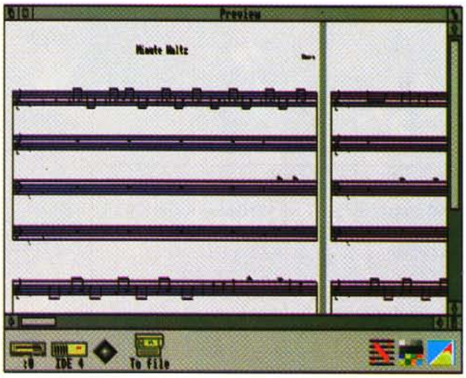
Copies: 1

Paper: ● Portrait ○ Landscape

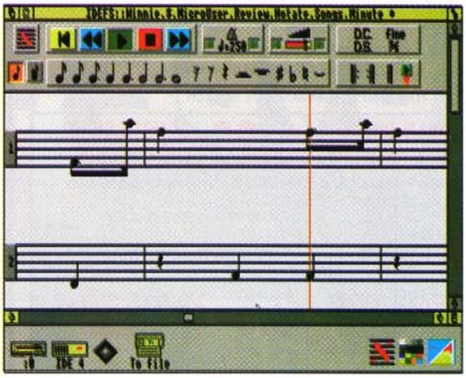
Options:- ☒ Title ☒ Page Numbers ☐ Track Numbers ☐ Bar Numbers

Format:- ☒ Whole Bars ☒ Justify

Job Title:



Previewing the print options



Playing the Minute Waltz. The red line shows the beats

IDEFS::Minnie.$.MicroUser.Review.Notate.Songs.Minute

an extent you can only have them sounding at the start of a bar. So copying from popular sheet music will cause problems because the chord rhythms are frequently more complicated than this. The chord facility seems a bit of an afterthought in this respect.

The video-style controls are used to play the music and to move through it, and the overall volume and tempo are also located on the toolbox. A Mixer window is provided which lets you alter the individual volume and stereo position of the tracks as a piece is played. Unfortunately this doesn't provide a *dynamic* alteration and the changes made aren't stored.

Split windows

Although only eight staves are allowed you can still get to the stage where you want to compose track one while comparing it to track eight – and the screen just isn't big enough. To help you is a split window option.

Selecting this splits the existing window in half horizontally producing two joined areas which can be scrolled separately in the vertical but together horizontally.

The red bar that separates them can be dragged up and down to change the proportions of the areas, but the lower window doesn't have a title bar or toolbox. I've only seen this kind of split window before on a Macintosh.

Printing follows a similar procedure to the Rhapsody program: A dialogue box appears giving various options, such as size, titling, portrait or landscape and so on, and from this a preview can be produced. This gives a representation of what the output will look like and splits the music into component pages.

The actual printing process is very simple and the speed will depend on the type of printer used. Like Rhapsody, Notate uses sprite images for the notes, so no matter how good your printer you'll still get chunky graphics on paper.

Single parts

One print option that's missing is the ability to print single parts. For a product aimed largely at the education market this seems an oversight. However, for the benefit of education, you can alter the types of notes that can be entered by changing the difficulty level.

Other forms of output include playing through a MIDI instrument. It's a very simple matter to assign the tracks to channels and the system will work with any standard MIDI card.

Alternatively you can save either as a Notate, MIDI or Maestro file. Using MIDI allows data to be transferred to Rhapsody. The Maestro format means that music can be written and freely distributed as every machine is supplied with it. In addition Maestro is a format supported by the multimedia packages Genesis and Magpie.

There are an enormous number of voices supplied and the program has the facility to load automatically voices which you can specify. Plus it will attempt to load voices for any song that requires ones not currently available. You can insert disc after disc until the correct voice is found – a very handy option. The voices can then be used with other programs.

There are lots of excellent examples supplied – Notate's lack of sophistication in musical notation certainly doesn't limit its versatility. You are also advised to produce template files containing particular voice combinations that you prefer to work with.

The manual runs to some 70 pages and 16 of these are devoted to classroom activities divided up by subject. There's usually an example file to go with each, plus lots of ways to experiment with the ideas presented.

Summing up

When compared to Rhapsody 2, Notate has fewer facilities, but as it's aimed at education rather than filling more generalised composition requirements this cannot be regarded as a deficiency.

It's fast and easy to use and with such a useful manual that whether it's used in the home or in the classroom, it will certainly return the investment made.

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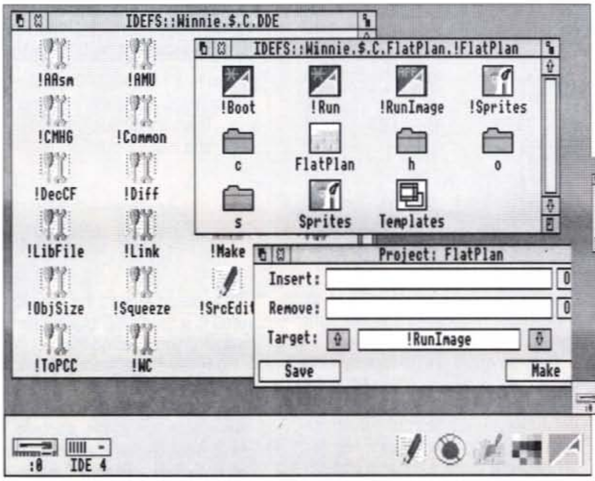
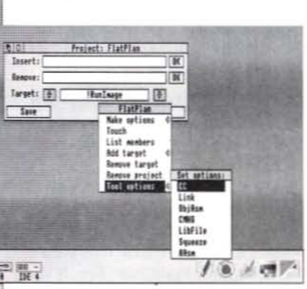
Supplier: Acorn Computers Ltd., Fulbourn Road, Cherry Hinton, Cambridge.
Tel: 0223 245200
Requirements: Risc OS. Minimum hardware 1Mb with two floppies or 2Mb with one floppy. Optimum hardware 4Mb with hard disc.



Insert:
Remove:
Target: !RunImage

The tools of the trade



Preparing to change the tool flags

Cing is believing

Steve Turnbull explores Acorn's new language development package

THE majority of commercial software on any 16- or 32-bit computer is written using C, because it is an extremely powerful high-level language that can be converted into very efficient machine code. In addition it is a standard which can be ported with surprisingly little modification between different types of computer.

In the context of Acorn's Risc OS machines, C has an added advantage that a library of shared routines – called Clib – can be loaded just once but used by more than one of the multi-tasking applications.

Although, right from the start, software writers have used Acorn's C versions 2 then 3, both these and all the accompanying utilities have been single-tasking – they take over the whole machine when they run. Additionally they can only be controlled from the command line, although the Make utility helps. In fact, a new version of Make is the key feature in the new system.

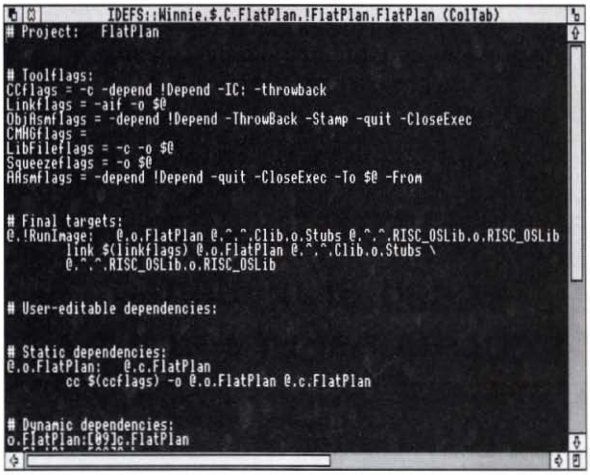
In its former incarnation you, as the programmer, had to create a special file which showed how each element of the final version was put together. For example, if you were creating a multi-tasking application that also used a relocatable module there would be two final pieces of code, the !RunImage and the module.

The !RunImage would be composed of the main code, written in C and the libraries it used which would have been compiled into an intermediate form ready to be linked to your code. Likewise the module would have its code, perhaps written in Assembler, and that too might use libraries.

Make it right

To produce the final result you would have to compile the !RunImage to the intermediate form then link it with the libraries to get the runnable code. Then assemble the module, perform any linking and output the code.

Using the make utility the special file would show !RunImage was composed of a C program that would have to be compiled using various options, and that the result of this should be linked with various libraries and the output put into a certain directory. The same applied to the module except that the original code should be assembled then linked.



```
# Project:   FlatPlan


# Toolflags:
CCflags = -c -depend !Depend -IC: -throwback
Linkflags = -aif -o $@
ObjAsmflags = -depend !Depend -ThrowBack -Stamp -quit -CloseExec
CMHGflags =
LibFileflags = -c -o $@
Squeezeflags = -o $@
AAsmflags = -depend !Depend -quit -CloseExec -To $@ -From


# Final targets:
@.!RunImage:   @.o.FlatPlan @.^.^.Clib.o.Stubs @.^.^.RISC_OSLib.o.RISC_OSLib
        link $(linkflags) @.o.FlatPlan @.^.^.Clib.o.Stubs \
        @.^.^.RISC_OSLib.o.RISC_OSLib


# User-editable dependencies:


# Static dependencies:
@.o.FlatPlan:   @.c.FlatPlan
        cc $(ccflags) -o @.o.FlatPlan @.c.FlatPlan


# Dynamic dependencies:
o.FlatPlan:[09]c.FlatPlan
```

What a Make file looks like

All the options had to be set by hand but the advantage of Make was that it checked the date stamps of files to see whether any of the source files for a particular action had changed since the last time Make was run, and only if a change had been made was that action carried out.

The new Make does the same thing, but it's multi-tasking and you need never see the file that's created. To begin you specify the name of a project and then set up the target files that need to be made, say !RunImage, and the final utility used to create that file, in this case Link.

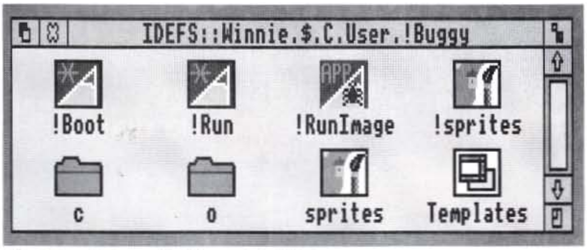
Then you just add all the source files used to create each target – the C source file and the semi-compiled libraries.

The clever bit is that you don't need to tell Make that the text of the source program has to be compiled before it is linked, that happens automatically. If you include some assembled code in a speed critical part of your program you can include that as a source file, and it will be automatically assembled before being linked into the finished product.

The whole Desktop Development Environment is integrated, so from Make you can call up a window from the compiler which allows you to set the specific compiler options that should be used when compiling that file. Similarly you can set options for the linker, assembler and so on.

Once you've set everything up all you have to do is click on the Make button and away it goes. Previously

➤



A typical application – with debug code included

➤

this would be the point to go away and make a cup of tea, but with the DDE that's not necessary because even the non-interactive tools like the compiler and assembler now multitask using a new version of the task module previously found in Edit.

Erro checks

No one writes programs that work first time so a critical part of programming is debugging. Errors fall into two major categories: Syntactical and Run-time. The first is of the *Missing bracket* variety, you've made a typing error or you've tried to make an integer equal to an array.

These errors are thrown out by the compiler and previously the best you could get was a text file listing them all. Then you'd have to go back to the source text, find the line and correct the error. But with the new version things are made a lot easier.

One of the compiler (and assembler) options is *Throwback*. When an error occurs the line number and error message are referred back to the source file, as long as the new text editor, !SrcEdit, is also loaded.

To find the line all you do is double-click the error entry in the Throwback window and the text editor finds the line and highlights it. Then it's up to you to fix it.

During the fix you may add or delete lines, which means that the line numbers for all the other error messages are now wrong. But Throwback compensates for that as well, and it will always find the right line for the error.

Runtime errors are notoriously hard to find, especially in compiled code where the final machine code is an unfathomable labyrinth of subroutine calls and apparently random register use. Where a program is also multitasking, this aggravates the problem even more.

To handle this Acorn have devised !DDT, Desktop Debugging Tool. To use it to the full you should set the debug options for the compiler, assembler and linker, then when the code is created, all the source information as to variable names, the actual source code and so on, are stored with the code itself.

Bug hunting

!DDT takes this information and allows you to set breakpoints within a program, watchpoints on the values of variables and registers, and you can interrupt the running program to find out exactly what it's doing.

When it's stopped you can enquire about the values of variables at the source code level, or find out abut memory locations and so on. The program can be single-stepped at the source code level, line by program line, or by ARM code instruction.

Within a C program you can step out through the various routine calls to see which routines are currently being used and the values of the arguments in the call.

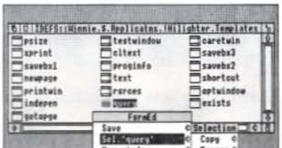
Perhaps the best feature of DDT, although it's entirely cosmetic, is the fact that it runs in a window environment. It's not a multitasking program itself – it can't be because of what it does. But it appears as a windowed program.

Both the assembler and compiler packages come with deliberately bugged programs to show how you can use the facilities of !DDT.

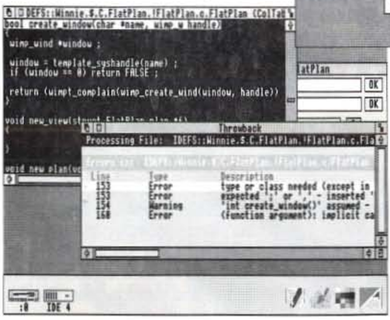
As mentioned, all the non-interactive tools will now multi-task, using the task module, but the other requirement is a module called FrontEnd. Using this you can incorporate any non-interactive utility into the suite of programs that can be used with the DDE. The full details of how to do it are supplied with the DDE documentation.

The final part of the Wimp environment are the templates that describe each of the windows used in a program. And to create the template file you should use !FormEd – a version of this has been around for a while and essentially this one is the same.

The most significant difference is that a single browser window with a list of the windows available is displayed instead of having all the windows on screen at the same time. Double-click on an icon in the browser to bring up the window to be edited. Deleting a window is now a separate option.



The new template editor



```
bool create_window(char *name, wimp_w handle)
{
 wimp_wind *window ;

 window = template_syshandle(name) ;
 if (window == 0) return FALSE ;

 return (wimpt_complain(wimp_create_wind(window, handle))
}

void new_view(st
{

}

void new_plan(vo
```

```
Processing File:  IDEFS::Winnie.$.C.FlatPlan.!FlatPlan.c.Fla

Line    Type       Description
 153    Error      type or class needed (except in
 153    Error      expected ';' or ',' - inserted '
 154    Warning    'int create_window()' assumed -
 168    Error      (function argument): implicit ca
```

Using the throwback debugging option

C here for an overview

You write a program in the C language using a text editor. The program you create is then converted – compiled – into machine code, using the C compiler. The classic example is the HelloWorld program that displays a message, and in C it looks like this:

```
#include <stdio.h>
main()
{
 printf("Hello world") ;
}
```

C is based around the concept of functions: Everything that performs an action is a function, including the place where the C program starts which is always a routine called *main*.

However, all the standard operations – like *printf* – are also routines, and must be included in the program, using the *#include* instruction.

The *stdio* library of routines would be supplied with the version of C that was appropriate to the machine it was to be run on. The above program would work on any machine it was compiled for, the only thing that would change is how the *printf* function displayed the words on the output device, and the programmer doesn't need to know about that.

Apart from *stdio* there are other standard libraries but with the Acorn C you also get libraries to handle all the features of the Wimp environment and other standard Risc OS operations.

In addition there are other libraries for providing further useful features. For example there's *alarm.h* which provides facilities for timing and calling specific routines at a certain time without the programmer having to re-invent the wheel.

Libraries that are new to C version 4, are routines that provide a standard font selection window, and ones that allow all the messages within a program to be held in a single, separate text file. Foreign language versions of a program can then be created by altering just the text file.

Summing up

Having used, and been impressed with, C version 3, I was completely astounded with this new release. Acorn have succeeded in unifying all the disparate elements of a development environment into an easy-to-use, intuitive and extensible set-up.

If you prefer to write in machine code the Desktop Assembler is worth it if only for the !DDT. If you use C the upgrade is essential. Anyone can manage with C version 3, but with version 4 and !DDT you'll double your development speed and reduce the chance of errors.

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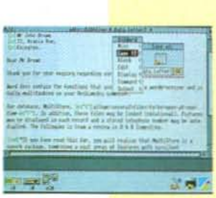

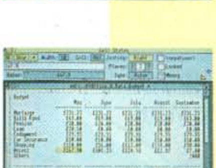

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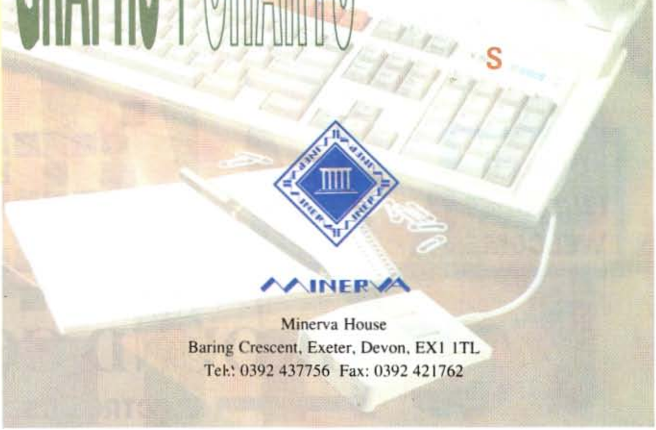

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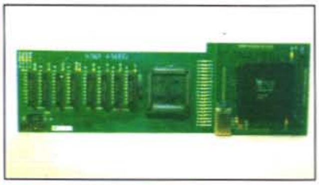

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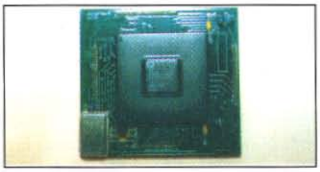

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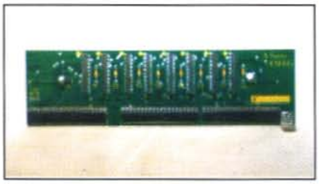

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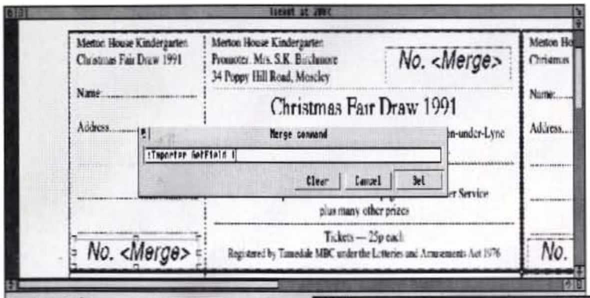


Merton House Kindergarten
Christmas Fair Draw 1991
Name
Address

Merton House Kindergarten
Promoter: Mrs. S.K. Birchmore
34 Poppy Hill Road, Mossley

No. <Merge>

Christmas Fair Draw 1991

plus many other prizes

Tickets — 25p each
Registered by Tameside MBC under the Lotteries and Amusements Act 1976

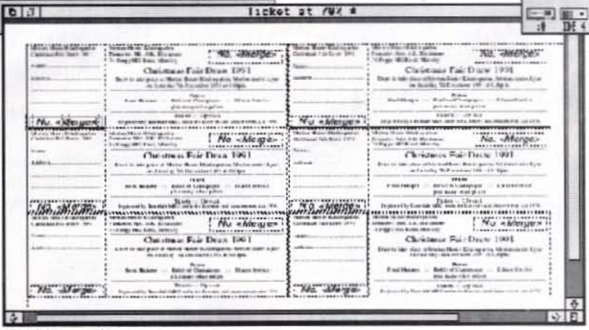
No. <Merge>

Merge command

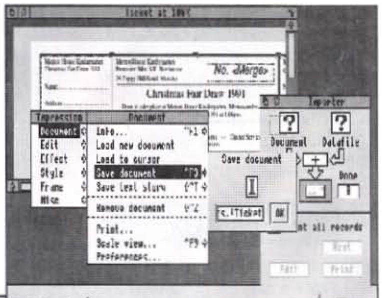
```
:Importer GetField 1
```

Clear
Cancel
Set

The completed ticket with merge commands



Six tickets on the page



Impression
Document
Edit
Effect
Style
Frame
Misc
Document
Info...
Load new document
Load to cursor
Save document
Save text story
Remove document
Print...
Scale view...
Preferences...
Importer
Document
Datafile
Done
Save document
OK

Setting up Importer

It's a lottery

Steve Turnbull shows how you can produce individually numbered tickets easily

AS a quality DTP product Impression, by Computer Concepts, is a superb piece of work, but with its Impulse software it becomes amazingly versatile. Impulse, described in detail in the September 1991 issue, is a system of sending messages between programs, but the messages are text-based so you, as the user, can decide what information is sent where.

Impression supports a number of commands, like Print, but it also has the facility to send Impulse commands that are embedded in the text – users of the Inter series of packages on the BBC Micro will be familiar with this idea.

In the Business Supplement, also supplied by CC, there's a mail-merging facility called Importer: This provides a controlling environment between a text file containing names and addresses, and Impression. So you set up your form letter, and spaces for the name and address are replaced with Impulse commands like this:

```
:Importer GetField 1
```

which would get the text of the first field of the current record from the application called Importer and include it in the main text of the document.

In its turn Importer controls the whole operation by sending a Merge instruction to Impression, which then prepares the document by getting all the data it needs. Importer then sends a Print command and Impression prints the document, with the newly merged information.

Importer goes on to the next record and this repeats until there are no more records to print. We can use this process to generate tickets by treating a text file of numbers as if they were names and addresses.

The tickets

A ticket is composed of two basic parts, the ticket itself and the counterfoil. The actual text and graphics within it is up to you. Select a Master page which matches your usual paper size then, in the main window, create a frame that's roughly the size of your ticket plus counterfoil and put in the text that you need.

For the actual numbering you should create a separate frame and put the letters ***No.*** then press Shift+Return. The Merge command dialogue box will appear. Type in the following:

```
:Importer GetField 1
```

and press Return or click the Set button, the word <merge> will appear. Now copy the frame (Control+C) and paste it (Control+V) into the counterfoil section. Now save your ticket.

Holding down Shift, click the main ticket frame and the two number frames – all the ticket frames should now be selected. Copy the group of frames (Control+C) and paste them as many times as they will fit on the page.

If you increase the scale up to 400% you'll find it easier to place the new tickets accurately. Now comes the tedious bit:

For every ticket on the page, except the first one, place the cursor just in front of the <merge> and press Shift+Return, this allows you to edit the Merge command. Change it so that on the next ticket you have *:Importer GetField 2* on both the main ticket and the counterfoil. For the third ticket change it to 3 and so on.

Save the result.

You may wonder why we use multiple copies of the ticket, especially since if changes are required we have to remember to alter each one – or delete all except one and then recopy.

Well, you could create a page that's the size of the ticket and then use the *Fit lots* option on the Print dialogue box to get as many as possible on to one sheet. Unfortunately this only works if there are multiple pages to the document – in fact as many pages as will fit on a sheet.

There's also the *Print same* button

GRAND RAFFLE
First prize: Night out with Des O'Conner
Second prize: Autographed John Major biography
"My Pea's Greener Than Yours
Third prize: Two nights out with Des O'Conner
Name
Address
Tel:
194363
194362
194364
194365
194367

➤

on the set-up menu, this has the disastrous effect of putting many copies of the same ticket – with the same number – on the sheet which is equally useless. So we're stuck with copying the ticket on to the same page.

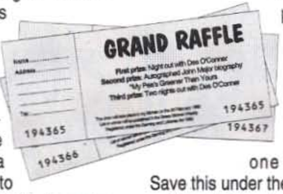
Using Importer

We need a short Basic program that will create a text file containing the numbers to be included in the tickets – or perhaps event programmes. The numbers are grouped as if in records, with the number of fields being equal to the number of tickets on each page. Type in the listing and ensure there's no typing errors using the checksums. Save it as NumberGen, when it's run it will ask you for the number of tickets required and the number of tickets on a page – you should try to fit on as many as possible. It creates a text file called TicketNums.

Run Impression and load up the prepared Ticket document, then run Importer, press Control+F3 and drag the save icon across to the Importer document icon, click the Importer *Print all records* button and then drag TicketNums on to the Importer Datafile icon. The printing process will then start.

This can take a very long time, depending on your printer – typically five hours for a hundred sheets containing six tickets per sheet via a laser printer. It's quite important to understand that if you try spooling to disc each copy of the document will overwrite the previous one, so that won't work either.

If you have the type of printer that stores a page and can print multiple copies quickly it is possible to speed things up. Create the page of tickets, with the Merge instructions held in separate frames – one for each ticket. Save this under the main filename.


GRAND RAFFLE
Name
Address
Tel
First prize: Night out with Des O'Connor
Second prize: Autographed John Major biography
"My Pea's Greener Than Yours
Third prize: Two nights out with Des O'Connor
194365
194365
194366
194367

Now delete all the merge frames and print the document in the normal way, as many times as required. Reload the original document and this time delete all the ticket frames and keep only the merge frames – being careful not to move them. Put the paper with the tickets printed on them back into the printer and this time print using the !Importer.

Because only the numbers need to be sent to the printer this step goes faster than it would if the whole ticket required printing everytime. So you could be through in half the time.

```
 10 REM > MakeTicks
 20 REM by Steve Turnbull
 30 REM (c) The Micro User
 40 Z%=OPENOUT"ticketNums"
 50 INPUT"Number of tickets to print",N%
 60 INPUT"Number of tickets per sheet",T%
 70 INPUT"Number to start at",C%
 80 WHILE N%>0
 90   FOR J%=1 TO T%
100     BPUT#Z%,FNn(C%)
110     C%+=1
120     N%-=1
130     NEXT
140   BPUT#Z%,""
150   ENDWHILE
160 CLOSE#Z%
170 *SetType ticketNums Text
180 END
190 DEFFNn(N%)="91"+RIGHT$("000"+STR$N%,4)
```

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 376A A
 50 = 4C56 5
 60 = E8C2 F
 70 = 7D78 B
 80 = D190 9
 90 = 3012 B
100 = FEAF 4
110 = 573D 2
120 = C4E7 C
130 = 2C83 4
140 = 8CB5 9
150 = 3882 B
160 = 1151 7
170 = DA8E 6
180 = FD2E 2
190 = 3459 E
```

It's the law

In the U.K., and most other countries, it is illegal to run a lottery without being a registered promoter. You can contact your local council for details about registering if you need to. However, competitions which involve skill are not subject to this restriction.

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Archimedes Software

Disc 7 - Chess - The best Archie Chess program
A Chess program that takes full advantage of RISC OS, installing itself on the icon bar and running on the desktop in a window. You can work with other programs whilst you play. Risc User July 1991 said: *"Chess is an absolute bargain. .playing at a comparable level it always beat Micro Power's offering. ...this has to be the one to go for".*
Acorn User October 1991 said: "*It plays an excellent game*".

Disc 8 - CrossStar 2.XX Crossword puzzle solver
RISC OS compliant desktop Crossword puzzle solver. 200,000 word dictionary. Solves interlocking clues. Editable/user definable dictionaries. Saves grids as Draw files. Browse through dictionary. Add new words to dictionary.

Disc 16 - Spark RISC OS Archive program
Spark, allows you to store files and directories in archive files in a very compressed form. e.g. sprites often take up only 10% of normal space. Files in archives, can be accessed just like files in disc directories. Reads these formats, zoo, zip, lzh, UNIX and Archie Tar, Compress.Writes PKarc, SEA/PC arc.

Disc 32 - Charm language and development environment
Charm, is a high level language like Pascal or C. This implementation, includes a compiler, linker and assembler, with an editor, and a desktop environment to use them from.

Disc 33 - Panorama. Your window on the World!
180,000 coordinates outlining the lakes, rivers, continents, borders etc. of the World and a program that can produce Draw files from them. You can make maps of any part of the world and then use them in DTP programs. Includes positions of nearly 1000 cities. Mercator and perspective projections.

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Banish Those Jaggy Blues !

Disc 35 Trace

- Trace converts Sprites into Draw files.
- Sprite format clip art is cheap and plentiful. Draw clip art is expensive and usually has to be painstakingly drawn by hand.
- Sprites take up lots of valuable disc space. Draw files are smaller.
- Scaled Sprites have jagged edges.
- Unlike some trace programs, Trace will work with full colour sprites.
- You can now use the powerful tools in Draw for manipulating Sprites.

Comes with D2Font program for making outline fonts from Draw files. So you can scan your own fonts. Cost £5.99 inclusive.

Clip Art Packs

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Pack #4: Peoples heads. Christmas. Easter. Halloween. Transport, boats, cars, trains planes. Old cars. Company logos and icons.
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Each pack is £5.99 inclusive.

David Pilling, P.O. Box 22, Thornton Cleveleys, Blackpool. FY5 1LR.

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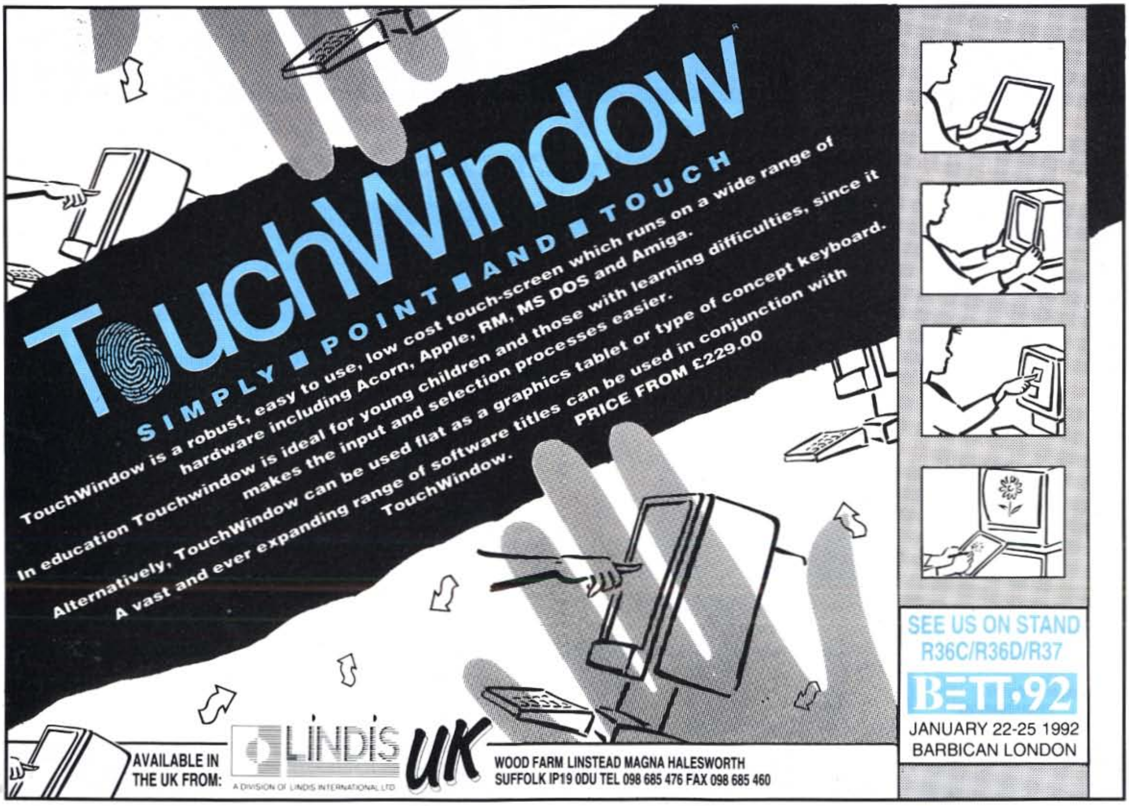

TouchWindow is a robust, easy to use, low cost touch-screen which runs on a wide range of hardware including Acorn, Apple, RM, MS DOS and Amiga.

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☆ 16 bit true R G B storage in 256k ram.

☆ Sequences of frames of a moving picture can be grabbed and stored in memory. Up to 30 frames in a 1 mb computer, 200 - 300 frames in larger computers!!

☆ Full screen area normally viewed on a TV set is grabbed in full.

☆ Images may be processed using our own high speed software routines or Acorn's Change FSI software.

☆ Quite simply the most powerful and easily used zooming and cropping routines available with any processing package.

☆ Two independent multitasking applications supplied, Non-multitasking software allows digitising without windows for adding still images to videos.

☆ Our hardware does not use interrupts so other applications run at full speed.

☆ Latest software includes built-in print routines. (Existing owners please contact us for a free update).

☆ Hard looking synchronising circuits for best results from video recordings.

☆ Available in a stand alone box for use with A3000. In this mode it can also be used with 300/400/500 series computers only occupying one expansion slot.

☆ Free seven day trial.

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The Pineapple PAL Coder is a stand alone unit which provides a coded video signal which can be recorder onto a VHS recorder or fed to a monitor with coded input.

The unit is inserted in the lead to the R G B monitor and provides an R G B output for the monitor together with a full specification PAL coded output. A second version provides a standard coded output also provides an S-VHS output for improved quality recordings on S-VHS recorders.

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☆ External to computer - no expansion slots used.

☆ Complete sync pulse regeneration providing a full CCIR sync waveform for best results on VHS recorders.

☆ Selectable to work with 625 interlaced screen modes or 624 line non-interlaced modes.

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BBC PCB Designer

This ever popular Rom based PCB designer is suitable for all BBC micros. It's fast high density 111 scale print routine allows prototype boards to be made directly from a printout, and a 211 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input routine and allows any component to be 'picked-up' and moved around the board without having to re-specify component interconnections.
The full auto-route facilities are available even on an un-expanded model 'B' computer. An archimedes version is available as a free upgrade to existing BBC owners or at a similar price to the BBC version.

'**PCB Auto-route is remarkable. No similar software comes near the price.**' Acorn User - August 88.

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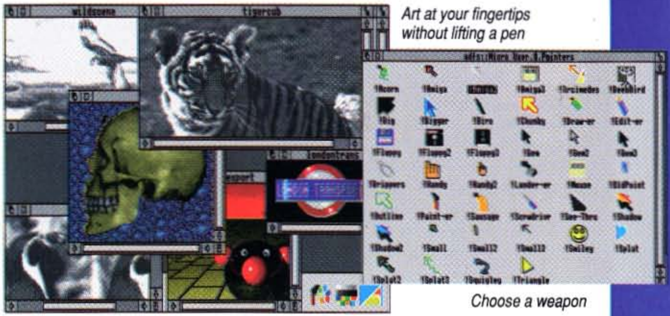
Access

Leap years ahead

Teri Paul examines some of the latest PD releases to grace her screen



Art at your fingertips without lifting a pen

Choose a weapon

A BIT of a mixed bag this month, from some older programs which have slipped through the net to some updates and new releases.

Richard Adams – not the one with the rabbits – kindly sent me some programs collated over the last year which he has found particularly interesting and useful. It was nice to see some of the older Brothers in Arm demos and I hadn't seen BallGame from Belgium's Lord of Entropy before. It is one of those games which sits on the icon bar. Not to be recommended for anyone with less than good eyesight.

Thanks to Nick Smith for the latest copy of his !PlayerMod – version 1.30, as well as some exceptional sounds: AlphaOmega, BwOfTraps, Dragon, FatalFunk, House and Scramble.

He also pointed out a problem some people have been having with !PlayerMod. It appears that should you run !VKiller on the program it corrupts the application. This is because Nick has already written into !PlayerMod a neat piece of code which deals with any nasty creepy-crawlies. Be warned.

Share and share

John Lyons Computer Software have been releasing some of their products into the PD – Fedei Defensor being the last. They have now decided to release almost all of their 60 BBC programs as shareware.

Mostly educational there are some very interesting and useful programs on offer. **Eating out – Understand that Menu** and **World in a Glass – Wines** are a couple which I tasted. They are presented in the form of multiple choice questions on a host of subjects such as specific questions concerning pasta, eggs, soups and so on, to questions on the best wine for a certain course and how wines are produced.

As the correct answers are given and there is a bonus available if you hit the glasses with the champagne cork, these programs are interesting, informative and fun. Well worth taking a look at.

There is a host of other programs on cooking, diets, nutrition and DIY too. A trial disc and catalogue is available for £1.50 from John Lyons Computer Software, Freepost, Camberley, Surrey GU15 3BR. Being shareware most programs cost £7.50 each and are well worth it, especially if you want to show off your expertise next time you dine out.

My thanks to Dave Thomas who recently sent me a disc of his PD programs – a whole host of pointers, sillies and utilities. If you are fed up with the simple arrow he has 40 different designs on offer, from squigley arrows and pencils, to smiley faces and the BBC owl. Just load them up and you're away.

Wonderful windows – but is it PD?

Some are a little difficult to use for work where you need to see the end of the pointer, but if you find the ideal just change your boot files – for hard disc users only. For the adventurous you could write a small program to randomly flick between all of them – and why not?

On a more serious note his utilities are some which I have found very useful and I will be covering a couple this month and some more in the March column.

!Filelist is first up and very simply it opens up a window to the vdu device. Now if you drag a file or application into it, it will find itself dumped out in the command window.

It's a simple and effective way to look at files to see what's in them.

Dave found it especially useful with Edit when the Filer has seen the program but insists on you loading it to see the text files – a problem most floppy users will be familiar with.

A grasping hand is the icon for !Grab. This program rips system sprites from memory. Loading it will install it on the icon bar, and selecting the icon will open a window. Edit or enter the filename and filing system you want to save your system sprites to and after selecting rom or ram sprites, off you go. Useful if you want to redefine your sprites, see what's available or find the name of a sprite you know exists.

Memory hungry

In fact this program is taken to its logical conclusion with !NewSprits. This changes the look of the system sprites to a style reminiscent of the 3D Impression icons. Pretty but not to be played with unless you have a lot of room in ram. I use 4Mb and it ate a lot of that. Useless information Number 402 – all the interest in 3D icons is down to Steve Job's NeXT Technology machine which has shown the way in a number of areas.

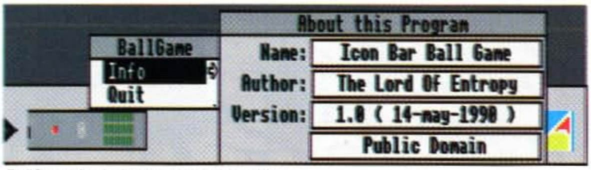
Finally an apology to those trying to use !DrawPlus on the January subscription disc. The gremlins managed to mess up the RunImage file quite successfully. A full and working copy will be on this month's disc.

Different strokes

I've had news from James Coates at the Different Ideas PD library. It appears that there have been some long delays in customers receiving their discs. The reason is that James has recently become a resident of Nene College. However, a solution has come along in the form of Alisdair Millard, but there will be a slightly longer delay as orders are forwarded to him. James has asked me to apologise to D Guiry, S Robson and D Bousfield on his behalf.

Archimedes owners can soon expect discs form DIPD too, while on the BBC side there is a major new release about to make its debut – PDHost. It's a full scrolling bulletin board host which promises to do virtually everything – a Viewdata version is being developed at present. If you'd like to see what all the fuss is about you can call 0568 612118 between 10pm and 6am, using a 1200/750 baud modem as well as some suitable scrolling communications software. An Archimedes version is promised *real soon now* too.

Wizard PD are changing their name to New Millennium PD due to another software company with a similar name. New Millennium PD can be contacted at Ryburn, Thorpe Lane, Cawood, Selby, Yorkshire YO8 0SQ.



About this Program

Name: Icon Bar Ball Game

Author: The Lord Of Entropy

Version: 1.0 (14-may-1990)

Public Domain

BallGame: Look closely and you'll spot it!

LET'S COMPUTE!

Rom and Ram

AT last things are getting interesting as we have a look at how characters can be moved around the screen. To do this we need to be able not only to PRINT but to UNprint too.

Type in Listing I and you'll see how the same image of a little snapper-type character printed further to the right each time gives a sense of movement. A delay is added at line 80 to slow the animation down.

Unfortunately each of the old images remains on screen and succeeds only in displaying a trail. So it's this surplus old image we must erase each time before we print the new one in its next position. The idea is that the displayed image remains on screen for as long as possible and that the erasure is as brief as possible.

We remove the old image by printing a space over it, add one to the X coordinate and then print the image in its next position. So add line 95:

```
95 PRINTAB(X,Y)" "
```

Now RUN it to see that this works. The only drawback with this particular program is that as the image is printed first and then erased. The last thing that happens is that the image is erased and you are left with a blank screen. You could add:

```
120 PRINTTAB(X,Y)A$
```

to rectify this.

To see what is happening when you print a space alter the background colour. Add line 65:

```
65 COLOUR129
```

Anyway, back to the program. The best you could say about this is that it works, but that's about all it does. There's no real animation within the image character itself. Most things that move have parts that are visibly moving so it's advisable to include as many devices as possible to display the illusion of movement convincingly.

NOT THAT KIND OF EOR ROM
WHACK!
HEE HAW!

So if we deploy two distinctly different images one after the other we can bring the image alive. Add line 45:

```
45 B$=CHR$225
```

which is our snappy-face again but with the addition of a cavernous mouth. One way of switching between the normal image and the open-mouthed image is to use MOD. If any number is divided by 2 the remainder is either 0 or 1. We can test the loop counter variable *I* with MOD2 as either:

```
I MOD 2 = 0
```

or:

```
I MOD 2 = 1
```

When the result is 0 we can print the normal image and when the result is 1 we print the altered image. Now the character opens and closes his mouth as he moves across the screen.

So much for horizontal movement. For vertical movement we only need to alter the Y coordinate instead of the X. Alter line 100 to:

```
100 Y=Y+1
```

Now we have a sprite that can move across the screen it would be far better if we could control it using the keyboard. This is very simple to do but first delete lines 70 to 110 and add the lines from Listing II. Now the sprite is first printed at line 80 and the MOD counter, to alternate between the two images, is stored in the variable *C* at line 90.

An endless REPEAT loop – between lines 100 and 230 – contain the instructions for detecting key presses and the movement of the sprite. As the direction that the sprite moves in will be variable, so must the amount added to or taken away from the X and Y coordinates. Two variables must be used to store these offsets from the original X and Y positions, in this instance *xadd* and *yadd* (line 110).

These variables will always equal zero unless a key is pressed (lines 120 to 150) so no movement takes place without you pressing the necessary key. Using INKEY followed by a negative number is the best way to detect which key has been pressed.

Each key has its own number – see page 275 of the 8-bit BBC Micro User Guide for a complete list. The particular keys used here are the more familiar Z X * ? used in most commercial games software. On the 32-bit machines you really need " instead of * but you can work that out yourself.

If we look a little bit more closely at the program we can see for example that line 120 looks to see if X is pressed. If it is, the variable *xadd* is made to equal 1. This is then added to the present X coordinate at line 200.

Note that *yadd* stays at 0 and is added to the Y coordinate at line 210 as neither of the keys for vertical movement has been detected at lines 140 and 150. The MOD counter at line 220 switches the variable *C* between being equal to either 1 or 0 and the appropriate image is then PRINTed at lines 160 and 170. If the flashing cursor is annoying you throughout these programs remove it by adding line 15:

```
VDU23,0,1;0;0;0;
```

So much for moving objects around at the text cursor. Despite the limitations of colours and the full character movement some excellent games can and have been made with user defined characters printed at the text cursor. The relatively rapid printing speed compared to that of the graphics cursor can make for swift and convincing animation.

Now let's try the same sort of thing at the graphics cursor – type in Listing III.

The first important thing to notice at line 110 is that the X coordinate is incremented by 64 and not 1. If you alter line 110 to 1 and RUN the program you will see that nothing happens for ages and then another image is printed over the first one but only slightly to the right of it.

This is because of the way the graphics screen is divided up – depending on which mode you are using. The minimum horizontal divisions in Mode 5 (and Mode 2) is eight. So adding 64 to the X coordinate will shift the sprite one full character width, 32 half a character and so on. Change line 110 to:

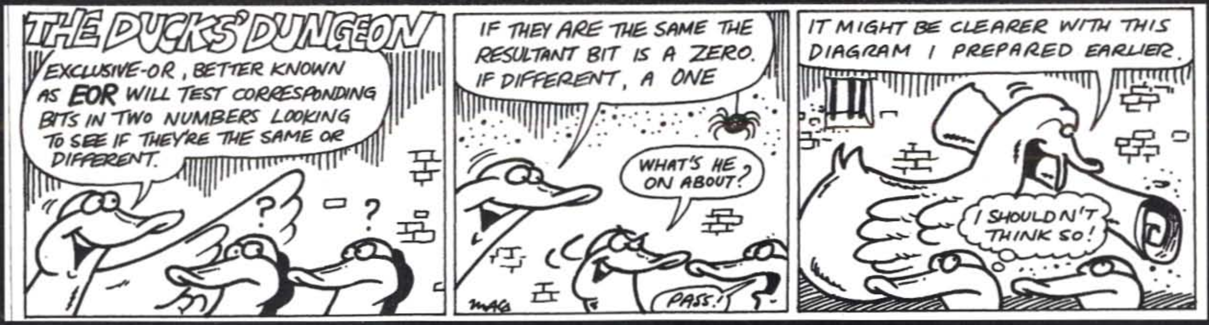
```
110 X=X+8
```

To erase an old image at the graphics cursor is somewhat different to that at the text cursor. Printing a blank space will not work as there is no background colour to a character using VDU5.

To get round this first print the sprite in, say, GCOL0,2 which is yellow in Mode 5, and to erase it print the same image in the same place only this time in the current background colour which in this instance is black GCOL0,0. Add the following lines:

```
 85 GCOL0,2
105 GCOL0,0
106 MOVEX,Y:PRINTA$
```

As you can see we now have smaller and therefore smoother movement left and right. Speed things up a bit by altering the delay at line 100 or remove it totally, depending on the computer you're using. Rich peo-


THE DUCKS' DUNGEON
EXCLUSIVE-OR, BETTER KNOWN AS EOR WILL TEST CORRESPONDING BITS IN TWO NUMBERS LOOKING TO SEE IF THEY'RE THE SAME OR DIFFERENT.
?
?
IF THEY ARE THE SAME THE RESULTANT BIT IS A ZERO. IF DIFFERENT, A ONE
WHAT'S HE ON ABOUT?
PASS!
MAG
IT MIGHT BE CLEARER WITH THIS DIAGRAM I PREPARED EARLIER.
I SHOULDN'T THINK SO!

What a lovely mover

Mike Goldberg starts making tracks

THAT'S NOT WHAT I CALL ANIMATED
ZZZZZ
ZZZZZ

ple might need to increase the delay.

That's the straightforward approach but far more interesting and useful is to plot colours by Exclusive-Oring them to the screen. See the Duck's Dungeon for an explanation. Change line 70 to:

```
70 GCOL 3,2
```

and remove lines 85 and 105. Run it and see that it works. It now appears we are printing the same image in the same place in the same colour each time.

So how come this works? Well, take a close look at line line 70 and you will see that instead of GCOL 0,2 it is GCOL 3,2. Usually we have seen a 0 where the 3 now appears but using GCOL with a number other than 0 has different effects on the colour plotted to the screen.

GCOL3,2 Exclusive-ORs the colour to be plotted with the colour already on the screen. When an image or point or line is printed on the screen using GCOL3,x if you then print the image over itself it wipes itself out. Not only that but the background the sprite was over is preserved and not destroyed as with GCOL0,x.

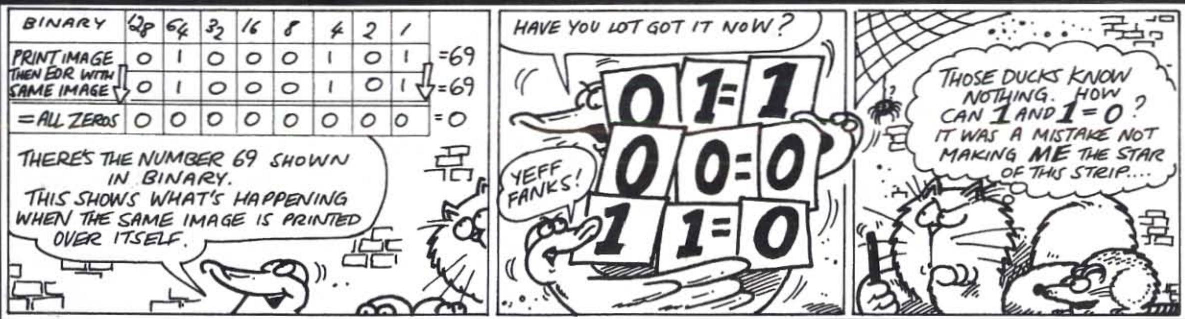
Using Exclusive Or (EOR) will become much more important later on when we tackle moving objects over others in machine code. But for now that's it. Practice printing your sprites with GCOL3,number in Mode 2 over different coloured backgrounds to see what happens.

● Next month we'll be exploring arrays and how these can be used to alternate between different images of a sprite. But the really interesting bit will be taking a peek at the Indirection Operators ? and ! for poking around with some really colourful and swift animation.

```
    0 REM LISTING1
    1 REM by Mike Goldberg
    2 REM (c) The Micro User
   10 MODE5
   20 VDU23,224,60,114,118,255,255,126,1
26,60
   30 VDU23,225,60,114,86,223,207,64,100
,60
   40 A$=CHR$224
   50 X=1:Y=12
   60 COLOUR2
   70 FORI=1TO15
   80 PRINTTAB(X,Y)A$
   90 A=INKEY(20)
  100 X=X+1
  110 NEXT
```

```
  0 REM LISTING2
 80 PRINTTAB(X,Y)A$
 90 C=0
100 REPEAT
110 xadd=0:yadd=0
120 IFINKEY-67xadd=1
130 IFINKEY-98xadd=-1
140 IFINKEY-73yadd=-1
150 IFINKEY-105yadd=1
160 IFC=0PRINTTAB(X,Y)A$
170 IFC=1PRINTTAB(X,Y)B$
180 FORT=1TO100:NEXT
190 PRINTTAB(X,Y)" "
200 X=X+xadd
210 Y=Y+yadd
220 C=(C+1)MOD2
230 UNTIL0
```

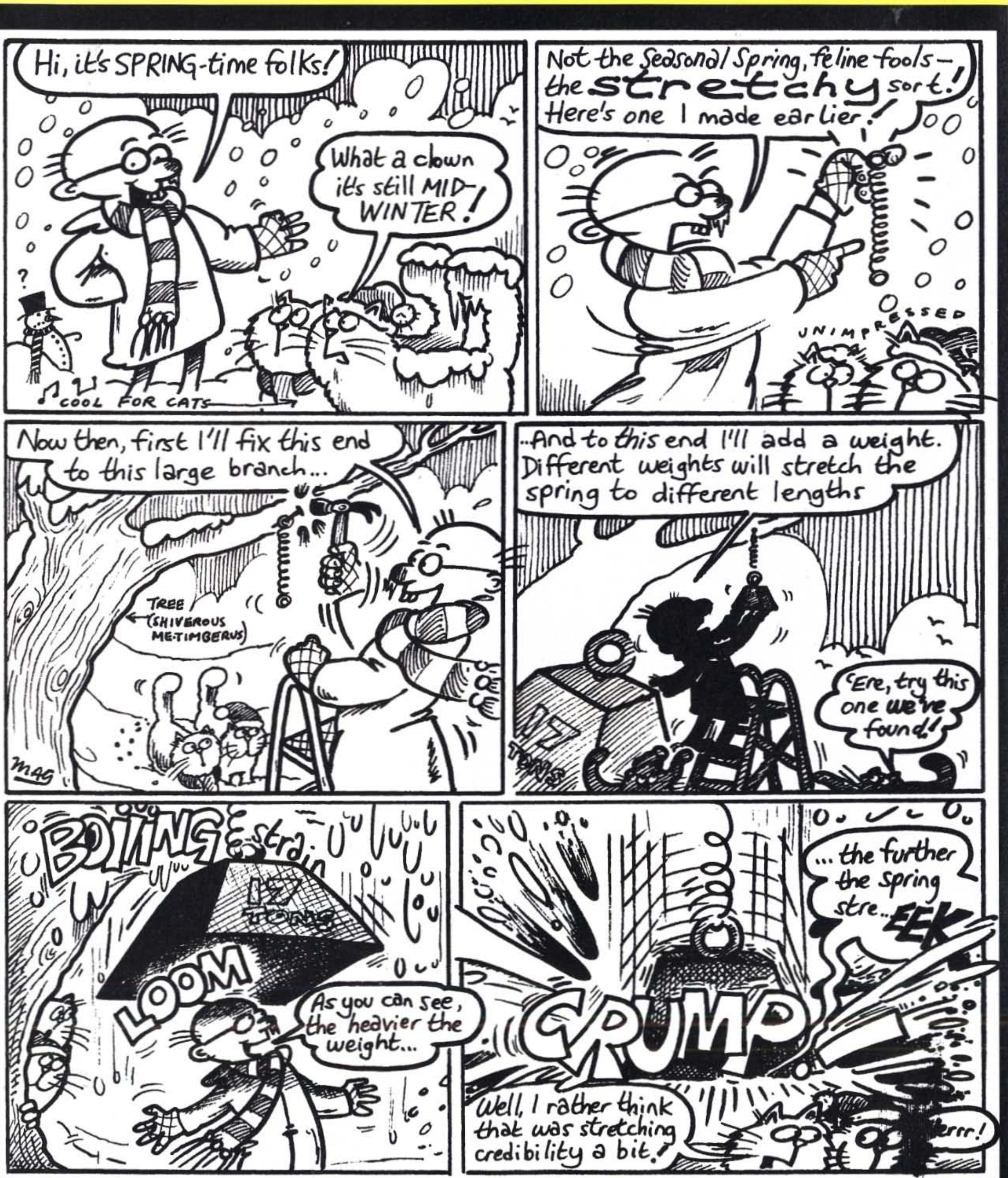
```
    0 REM LISTING3
   10 MODE5
   20 VDU23,224,60,114,118,255,255,126,1
26,60
   30 VDU23,225,60,114,86,223,207,64,100
,60
   40 A$=CHR$224
   50 X=32:Y=512
   60 VDU5
   70 GCOL0,2
   80 FORI=1TO15
   90 MOVEX,Y:PRINTA$
  100 A=INKEY(20)
  110 X=X+64
  120 NEXT
```



BINARY	128	64	32	16	8	4	2	1	
PRINT IMAGE	0	1	0	0	0	1	0	1	=69
THEN EOR WITH SAME IMAGE	0	1	0	0	0	1	0	1	=69
=ALL ZEROS	0	0	0	0	0	0	0	0	=0

THERE'S THE NUMBER 69 SHOWN IN BINARY. THIS SHOWS WHAT'S HAPPENING WHEN THE SAME IMAGE IS PRINTED OVER ITSELF.
HAVE YOU LOT GOT IT NOW?
0 1=1
0 0=0
1 1=0
YEFF FANKS!
THOSE DUCKS KNOW NOTHING. HOW CAN 1 AND 1=0? IT WAS A MISTAKE NOT MAKING ME THE STAR OF THIS STRIP....

The Safe


Hi, it's SPRING-time folks!
What a clown it's still MID-WINTER!
?
COOL FOR CATS
Not the Seasonal Spring, feline fools – the stretchy sort! Here's one I made earlier!
UNIMPRESSED
Now then, first I'll fix this end to this large branch...
TREE (SHIVEROUS ME-TIMBERUS)
MAG
...And to this end I'll add a weight. Different weights will stretch the spring to different lengths
17 TONS
'Ere, try this one we've found!
BOING
strain
17 TONS
LOOM
As you can see, the heavier the weight...
CRUMP
... the further the spring stre... EEK
Well, I rather think that was stretching credibility a bit.
errr!

Scientist

A spring's the thing

The Safe Scientist finds a simple and easy way to explore an amazing science subject

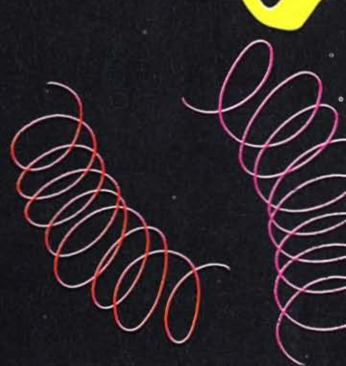
PEOPLE have always been fascinated by stretchy things and the first person to invent a spring must have been really pleased with him or herself.

This month, I'm presenting you with a very simple investigation. You have a spring hanging up and you can fix more and more weights to it. The program keeps a chart showing the length of the spring with the different weights on it. This is, of course, all about forces which are a crucial section of the National Curriculum.

Your job is to look for a pattern in the results. It shouldn't be too difficult to see, but the actual strength of the spring changes randomly from one experiment to the next.

Ask yourself questions like *Does doubling the weight hanging on the spring double its length?* Then try refining the questions until you find a rule which works all the time.

Being a very Safe Scientist, I've made sure that you can't break the spring. With real springs interesting things happen when they get near to breaking and they won't then follow the rule you might discover in this program. I've used simple character graphics to represent the spring. These work reasonably fast with all Acorn computers. Good programmers might like to try more realistic graphics.



● *If you've stopped bouncing around by next month, you can look forward to getting some pictures in focus as we investigate lenses.*

```
   10 REM SPRINGS
   20 REM By The Safe Scientist
   30 REM (c) The Micro User
   40 MODE1
   50 PROCvars
   60 PROCdrawstart
   70 REPEAT
   80 PROCaddweight
   90 PROCcalcnewlength
  100 UNTILw=1000
  110 PRINTTAB(10,30)"PRESS SPACE TO START AGAIN"
  120 REPEATUNTILGET=32:RUN
  130 END
  140 DEFPROCvars
  150 pos=0
  160 F=RND(10)
  170 VDU23,224,240,15,240,15,240,15,240
,15
  180 VDU23,225,240,15,240,15,0,0,0,0
  190 VDU23,226,255,231,247,247,247,247,
227,255
  200 VDU23,227,255,195,153,189,189,153,
195,255
  210 VDU23,228,56,72,72,8,8,8,8,8
  220 weight$=CHR$226+CHR$227+CHR$227
  230 spring$=CHR$224+CHR$8+CHR$10+CHR$2
24+CHR$8+CHR$10+CHR$224
  240 ENDPROC
  250 DEFPROCdrawstart
  260 PRINTTAB(10,2)"SPRINGS"TAB(10,3)"-
-------"
  270 PRINTTAB(13,4);spring$
  280 PRINTTAB(13,7);CHR$228
  290 COLOUR1:COLOUR130:FORN=18TO28:PRIN
TTAB(2,N);weight$:NEXT
  300 PRINTTAB(1,30)"WEIGHTS"
  310 MOVE700,132:DRAW932,132:DRAW932,90
0:DRAW700,900:DRAW700,132
  320 MOVE932,132:DRAW1164,132:DRAW1164,
900:DRAW932,900
  330 FORN=132TO900STEP64:MOVE700,N:DRAW
1164,N:NEXT
  340 COLOUR3:COLOUR128
  350 PRINTTAB(23,4)"WEIGHT"TAB(30,4)"LE
NGTH"
  360 PRINTTAB(25,6)"0"TAB(32,6)"3"
  370 ENDPROC
  380 DEFPROCaddweight
  390 PRINTTAB(10,30)"PRESS SPACE TO ADD
 WEIGHT"
  400 REPEATUNTIL GET=32
  410 pos=pos+1
  420 COLOUR128:COLOUR3
  430 PRINTTAB(2,pos+17);SPC(3)
  440 PRINTTAB(12,pos+7);SPC(3)
  450 PRINTTAB(13,pos+6);CHR$224;TAB(13,
pos+7);CHR$228
  460 COLOUR1:COLOUR130
  470 FORX=1TOpos:PRINTTAB(12,X+7+pos);w
eight$:NEXT
  480 ENDPROC
  490 DEFPROCcalcnewlength
  500 L=3+pos*F:w=100*pos
  510 COLOUR3:COLOUR128
  520 PRINTTAB(25,6+pos*2);w;TAB(32,6+po
s*2);L
  530 ENDPROC
```

```
 10 =    0 0     190 = F939 F     370 = ED0F F
 20 =    0 0     200 = A033 B     380 =  A6A A
 30 =    0 0     210 = 89F6 C     390 = F502 C
 40 = EA3A A     220 = CDE8 5     400 = 1664 1
 50 = 92AD D     230 = 6D45 8     410 = 2F01 3
 60 = BF5A D     240 = ED0F 5     420 = 24B3 5
 70 = BFBA B     250 =  C98 F     430 = ED35 D
 80 = B9A8 C     260 = B20F 4     440 = 2A89 B
 90 = 4F4C B     270 = 5BDE 8     450 = EB75 9
100 = C9E5 F     280 = BDB8 6     460 = 5189 C
110 = C159 C     290 = 9776 8     470 = 1EF2 3
120 = C784 9     300 = 607F 0     480 = ED0F F
130 = FD2E E     310 = 30C8 E     490 = 6DD6 B
140 = 785A 1     320 = 1986 8     500 = DC84 2
150 = 5478 A     330 =  EF6 9     510 = 68F0 1
160 = 2D2C A     340 = 68F0 D     520 = D0E4 1
170 = B549 5     350 = AA92 E     530 = ED0F E
180 = 5A52 C     360 = 772A C
```

PRES

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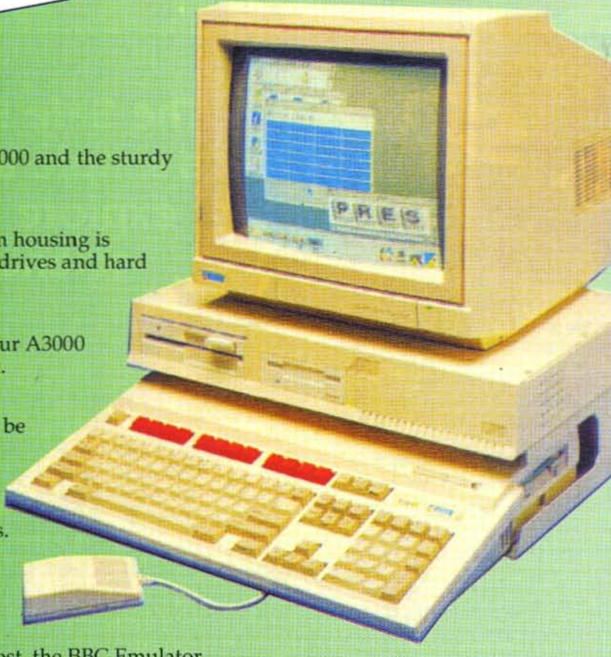

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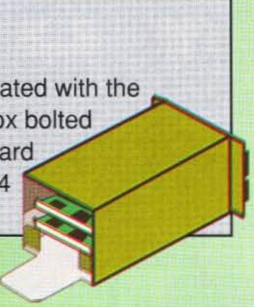

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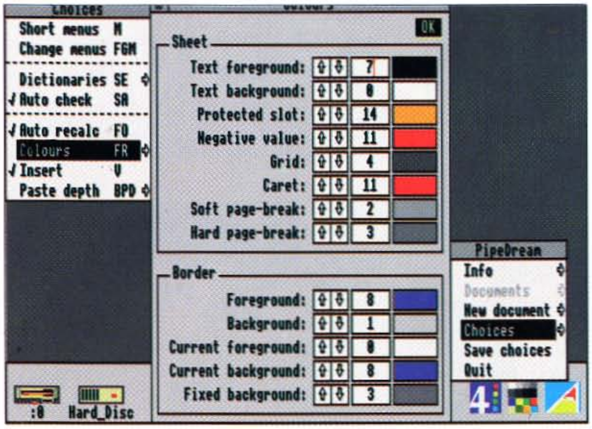

Choices
Short menus M
Change menus FGM
Dictionaries SE
√ Auto check SA
√ Auto recalc FO
Colours FR
√ Insert V
Paste depth BPD
OK
PipeDream
Info
Documents
New document
Choices
Save choices
Quit
:0 Hard_Disc

Sheet

Text foreground: 7
Text background: 0
Protected slot: 14
Negative value: 11
Grid: 4
Caret: 11
Soft page-break: 2
Hard page-break: 3

Border

Foreground: 8
Background: 1
Current foreground: 0
Current background: 8
Fixed background: 3

Choices menu

PipeDream file compatibility

In general, files are forward compatible – files from earlier versions of PipeDream will load and run perfectly in later versions, regardless of which computer they are on.

There are some exceptions with PipeDream 4 and some earlier files do require editing. These mostly involve the changed arguments of database functions and the single quote mark not being valid in expressions.

Obviously, older versions of PipeDream don't contain all the features of the later ones. So files will be completely compatible if only the features of the older version are used.

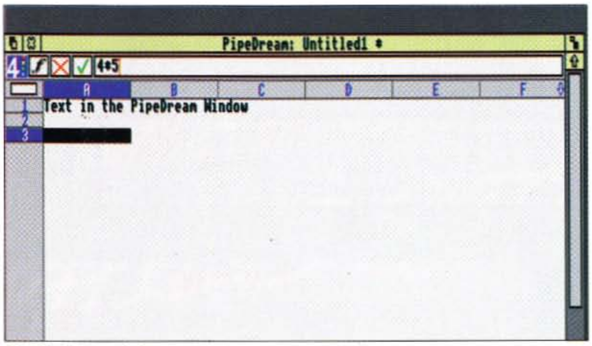
The main problem areas when loading PipeDream 4 files into other versions are setup options, such as example fonts, and the more advanced spreadsheet and database functions. Older versions will load files containing unsupported facilities, but they may require editing. Word processor files generally transfer well.

View Professional and Z88 PipeDream are quite restricted in the size of files they can load.

Product: PipeDream 4
Price: £196
Supplier: Colton Software, 2 Signet Court, Swanns Road, Cambridge CB5 8LA.
Tel: 0223 311881
Requirements: Risc OS

Dream on

John Allen sees how PipeDream 4 has improved on earlier versions


PipeDream: Untitled1 *
4+5
A
B
C
D
E
F
1
2
3

Text in the PipeDream Window

The PipeDream window

PIPEDREAM was one of the earliest items of software for the Archimedes and has been consistently popular. A spreadsheet which also has powerful word-processing and database functions, to my mind Pipedream is the easiest top-of-range spreadsheet to use.

While as a wordprocessor it has many advantages over 1st Word Plus, not the least is that it is able to use Risc OS fonts, with the launch of PipeDream 4, it's now a perfectly respectable database.

So what are the major changes? There's now a greater range of built-in functions, particularly covering complex numbers, strings, dates and matrices. PipeDream 4 has a much improved user interface and can produce charts within documents. These automatically change as the value of expressions elsewhere in the document change.

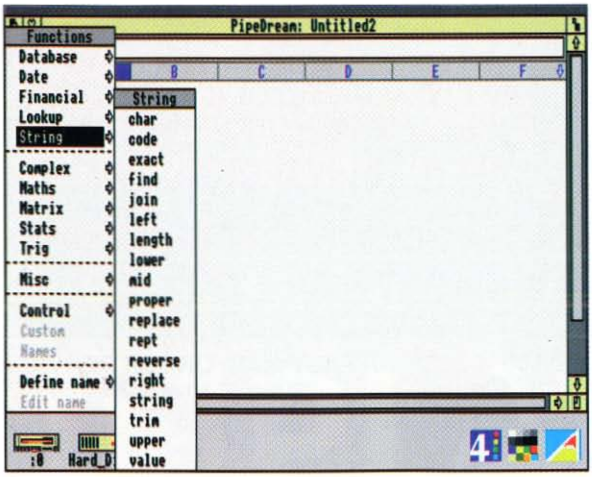
Unlike previous versions, PipeDream 4 comes on two discs. The program itself is on the first, with the second holding examples: The Z88 filer – allowing files to be saved and loaded from the Cambridge Computer Z88 portable – and a Lotus 1-2-3 converter.

Once loaded, there's a new PipeDream 4 icon. This has the same filetype number as PipeDream 3, so it's compatible with old files. When a document window is opened, it looks quite different. Gone are the confusing column labels along the top, in their place are nice clear markings. If you want to change the width of a column just drag the right hand margin with the mouse.

There are also new symbols at the top of the window. From left to right:

The PipeDream 4 logo – Clicking on this opens a formula window for composing expressions too large to fit into a slot.

The functions icon – This gives a


PipeDream: Untitled2
Functions
Database
Date
Financial
Lookup
String
Complex
Maths
Matrix
Stats
Trig
Misc
Control
Custom
Names
Define name
Edit name
String
char
code
exact
find
join
left
length
lower
mid
proper
replace
rept
reverse
right
string
trim
upper
value
B
C
D
E
F
:0 Hard_D

The functions menu

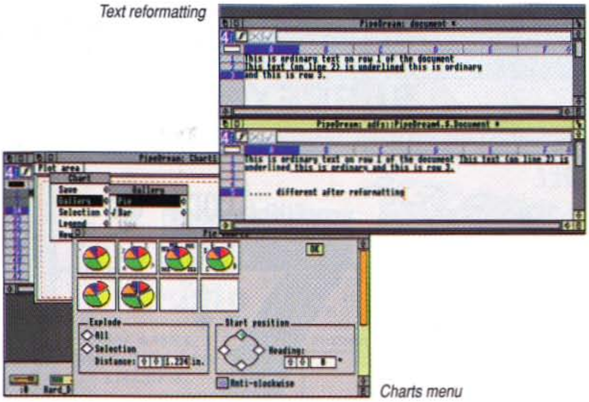
PipeDream – The histo

PipeDream is mostly written by Mark Colton, who wrote the View family of applications for the 8-bit BBC Micro. Indeed, the original version of PipeDream was called View Professional.

Sir Clive Sinclair's portable, the Cambridge Computer Z88, contained the first version carrying the PipeDream name.

In 1987 versions appeared for the IBM PC and Archimedes running under the original Arthur operating

Text reformatting



This is ordinary text on row 1 of the document
This text (on line 2) is underlined this is ordinary
and this is row 3.

This is ordinary text on row 1 of the document This text (on line 2) is underlined this is ordinary and this is row 3.

..... different after reformatting

Charts menu

handy reference to the 162 functions built into PipeDream 4.

The cross icon – Deletes the expression in the formula line.

The tick icon – Accepts the expression in the formula line.

The formula line – Where the current formula is normally edited.

On the left, underneath the PipeDream 4 logo, is the marked icon. Select this when there's a marked block and any markers will be removed, otherwise clicking on it will mark the whole document.

There are three ways of entering commands: Conventional Risc OS menus – these can be set to either contain all of the commands or your own selection of them – control key shortcuts and function keys. The function keys have been changed to be more compatible with other Risc OS programs, but they are less comprehensive, and I missed some of the things that can be done in PipeDream 3.

With this in mind Colton have provided a command file which, if renamed to Key in the !PipeDream directory, will install the old function key layout when PipeDream 4 is loaded.

There's a new Choices menu allowing standard options to be set up easily, which largely replaces the need to use a key file to customise PipeDream. However, such files can still be used and are needed to lock dictionaries into memory at start-up or to reprogram the keyboard.

Size

PipeDream 4 is larger than its predecessor, both in terms of disc space and memory requirements. It can be used on a basic 1Mb machine, but it's a tight squeeze.

Spell checking can be a big problem on a basic machine with only a single floppy disc drive. Ordinarily PipeDream has its dictionary on disc and if this is a floppy, PipeDream is slowed considerably by the disc access. This can be solved by locking the dictionary into memory, but 1Mb is not large enough for that.

Use this solution on a 2Mb machine and you run up against another problem with user dictionaries – words you've collected that aren't in the main dictionary. Because there's so little space on the working disc there is not space for large user dictionaries, so loading extra dictionaries involves a lot of disc swapping. Colton say that they view user dictionaries as a feature for advanced users, who they expect to have a hard disc.

Anything that uses extra memory, like using or printing fonts, is difficult – if not impossible – on a 1Mb machine. The fact is that 2Mb is really the sensible *minimum* machine size for PipeDream 4.

Charts are the big new feature in PipeDream 4. Pie, bar line and scatter charts can be created, all of which will redraw as data is changed within the document. This is much more powerful than exporting data to an external package and placing the resulting chart into a PipeDream document as a sprite.

Unfortunately, many of the chart drawing parts of PipeDream were not functioning as *The Micro User* went to press, so I am unable to properly review these features.

Minor drawbacks

I use PipeDream a lot as a word-processor and I'd have liked to have seen something to ensure that highlighted text reformats properly. As the illustration shows, things can go wrong if highlighted text is split by a line end.

I also like to transfer text from PipeDream into Impression from time to time. The easy way to preserve effects and formatting is to save the file in 1st Word Plus format and use the appropriate loader module in Impression. Unfortunately, PipeDream sets the filetype of a 1st Word Plus file as Text, so this has to be manually corrected using *SetType on the command line before it can be loaded into Impression. There is also something wrong with the scrolling when Risc OS is configured for Instant effect window drag. Moving through a document by dragging the vertical scroll bar produces a confusing display as PipeDream 4 struggles to redraw the screen. Using the up and down scroll arrows moves the contents and the display is correct.

Summing up

PipeDream 4 is a significant advance on its predecessors and continues to be one of the most useful and powerful applications available.

It is not cheap, but there's certainly no need for any other word-processor or spreadsheet. It can also be used in place of a conventional database. Even replacing a desktop publishing package in some cases.

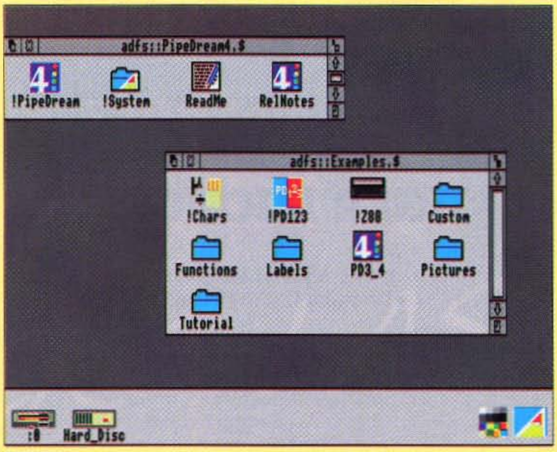
Using PipeDream 4 with a Z88

Z88 PipeDream is still by far the most common version of the software, and it works well alongside PipeDream 4. File transfer is easy, provided that the Z88 is fitted with the PC link rom and connecting cable. Both are available from Colton Software. Also you'll need a serial port on your Archimedes. BBC A3000 owners will have to have their machines upgraded, as the chips aren't fitted.

The Z88 filer on the Examples disc is installed on the icon bar and the Z88's memory is available to PipeDream 4 as if it were a disc. The filer can also be used to transfer Z88 files to discs.

Files which only contain the features of Z88 PipeDream can generally be passed between the two machines with a high degree of compatibility. But files containing features only found in PipeDream 4, may be more problematic.

This affects two main areas: Functions which are not in Z88 PipeDream, which the Z88 will treat as typing errors. When such a sheet is sent back to PipeDream 4 the expressions will work again, provided they have not been altered. Secondly, global features such as fonts will be removed when the file is saved from Z88 PipeDream and these will have to be redefined in PipeDream 4.



Z88 Filing

system. Referred to as PipeDream 2, the advent of Risc OS saw the release of PipeDream 3 completely revamped to use the Desktop.

PipeDream 4 is an updated version of PipeDream 3. The menus and keyboard shortcuts still follow the structure of those on the Z88.

View Professional, Z88 PipeDream and PC PipeDream 2 are all still available, so it has a continuing compatibility over several different computers.

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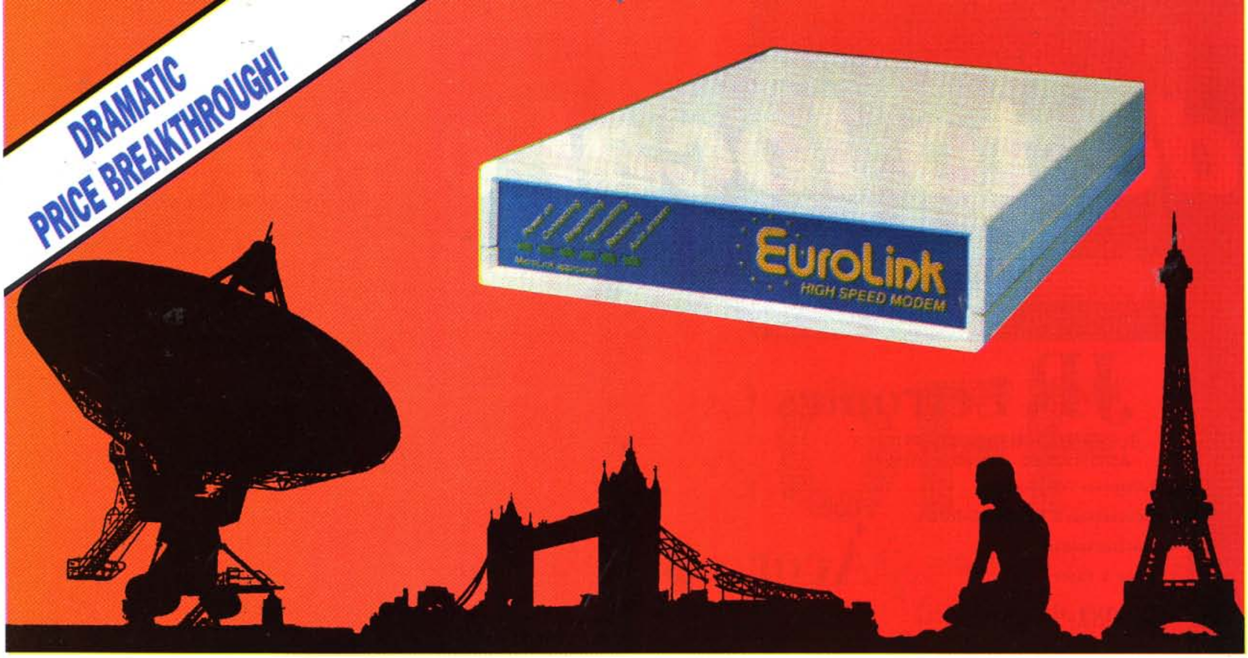

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Beeb emulation

I BECAME an owner of an A3000 in October 1991 and took out a subscription to The Micro User.

I looked forward to receiving the magazine with the free disc each month, but I am having trouble loading all the games, as the computer keeps saying Code runs too low *or* Address exception at ... **– T. J. Grant, Crowle, Worcs.**

●The Archimedes subscription disc contains a variety of programs, free demonstration games, public domain software and listings of the programs featured in that month's magazine.

It sounds like you have been trying to run the BBC listings directly and to do this you must first of all load the BBC Emulator supplied on your Application Discs which come with any Archimedes. Then just load and run the programs as you would on a BBC Micro.

32 *v* 16 bits

I WANT to buy a computer which has good graphics and quite a few games, but I also want access to serious applications such as word processing.

I know that the Amiga 500 and the Atari ST are 16-bit computers, but what does this mean and is the A3000 any better with its 32 bits?

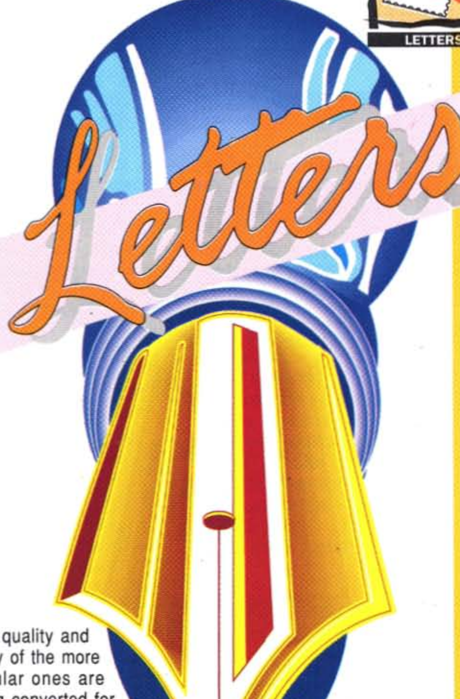
If I buy an A3000 would I be able to play PC games using the PC Emulator and would I be able to use my 5.25in drive without needing any interfaces? **– D Gillbanks, Warrington, Cheshire.**

● The number of *bits* that a computer has refers to how much data it can process in one chunk – and this is reflected in its overall speed. So an A3000 is faster than either an Amiga or an ST in general terms.

The graphics on the A3000 are better than an ST but not as good as an Amiga. The A3000's sound is better than either but the ST has a built-in Midi port. The Risc OS windowing system on the A3000 is vastly superior to Gem on the ST, and streets ahead of the Amiga.

An ST can't multi-task and trying to run multiple tasks on a low specification Amiga is not a good idea if you're in a hurry. Risc OS provides a very natural and fast multi-tasking environment.

There are less games available for the A3000 than the other two machines, but the ones that do exist are of very high quality and many of the more popular ones are being converted for the Acorn machines.



As for playing PC games on the Emulator, if you want adventure games then it's barely passable, but for arcade games the speed is far too slow.

The A3000 is a much more versatile machine than either of the other two, as you can tell from the TV advertising that all three companies have indulged in this Christmas.

Both the Amiga and ST are portrayed as just games machines – apart from a brief view of Deluxe Paint II in the Amiga ad – in an effort to fight off the games consoles. The A3000 on the other hand is a Master of all Trades.

You will need an extra interface if you want to access 5.25in discs.

Game control

PRIZE letter

IN THE November issue of Problem Solved there was a section titled Not much joy. Mike Cook produced an interesting treatise on the subject of mouse drivers, with one short practical suggestion at the end.

Now I am, of course, full of admiration for the work that he produces though the magazine, but on this occasion I think he has fallen into the trap of not seeing the wood for the trees.

The solution to alternative control of Archimedes games may depend on what the games programmers have allowed for as much as a user preference for device type.

If the game is normally only mouse controlled, then two out of the three possible options suggest themselves: Replace the mouse with a Voltmace Deltacat joystick; use the PD Warfarin module to effect mouse simulation from the keyboard; or replace the mouse function by a control module with Atari-type 9-pin switch mode type joysticks.

The game factors involved in choosing from these are broadly dependent on the type of game. The flying games such as Zarch or simulators like Interdictor and Chocks Away are better controlled with the Voltmace Deltacat. This closely mimics the proportional action of a mouse with the added benefit of its own x/y direction sensitivity controls. Also flight simulators and other programs on the market have a special control mode option built-in to make the best and most natural use of the Voltmace device.

The other two options are rated second as they only offer broad directional control. Warfarin enables the keyboard to mimic mouse direction or key presses. In combination with the Alt key, the cursor keys give direction, leaving Insert, Home and Page Up to simulate the three mouse buttons. Useful, but not very convenient for some games.

The exception is when small positional mouse/screen pointer changes are needed.

For instance, I have found that E-Type responds best this way as it needs to make small regular sideways movements on the road. You do need a large enough hand and good finger control to operate three to four keys simultaneously.

A number of semi-static board games may also fall into this category. In the situation just covered it may well be that the Switch joysticks in their mouse emulation mode would do just as well. I haven't tried the 9-pin switch sticks, but there are two different interfaces available. First on the market was the RTFM model called the Games Controller. This plugs into the unused Econet socket on the motherboard and has software control options for a number of existing Archimedes games.

The second offering is from The Serial Port and plugs externally into the parallel printer port. If offers an onward connection for printer, dongle and so on. It is currently cheaper that the RTFM model and also more comprehensive in that it provides a script language for user-control.

The most useful function of this type of control, is its ability to have joystick movements mimic Archimedes keyboard presses. So for those usually larger games which need a large number of different key presses, simplification should be possible, though you may have to compile a crib sheet. **– Ray Waters, Colchester, Essex.**

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Fortran friends

AS A practising scientist I have been writing Fortran programs for many years. I have Acorn Fortran 77 for my Archimedes, but since Acorn show little signs of updating Fortran – as they have C and Assembler – I am trying to form a self-help group, which I call Fortran Friends.

I maintain a list of known errors in the compiler and I would also like to make a list of any commercially available Fortran libraries or scientific programs for the Archimedes. I have made a Fortran Desktop front-end and a set of assembler subroutine libraries for use with Fortran 77. These are Graphics, SpriteOps, Utilities with Wimp and Create Draw file libraries in preparation.

Now I am looking for others who may know of further Fortran errors or other Fortran libraries or have additional routines they would like to contribute to a public domain set of Fortran Tools – particularly any numerical algorithms to which they hold the copyright. If there are enough routines, I shall set up a public domain library for the software and documentation.

I do have two queries which you might be able to help with. First, is anyone

➤

➤

making a version of the Fortran 90 compiler for the Archimedes?

Second, when a Fortran program has an error – such as an attempt to take the square root of a negative number – the current version of Fortran 77 detects the error and prints error messages on the screen.

Unfortunately, these messages are lost when the program is running in the Wimp environment. Is there any system variable set up or any other way which would give information on these errors for my program to display in a window? – **Kate Crennell, Greytops, The Lane, Chilton, Didcot, Oxon OX11 0SE.**

● Due to only having a passing acquaintance with Fortran we don't know any solution to your problem. Perhaps another reader can help.

At random

AS FAR as writing programs goes, I am very much a novice so I am turning to you for help. I am trying to write a routine or procedure to fit into a program that will choose randomly a set of numbers between 1 and 58 and present them in the same column.

The problem I am having is that the numbers to be chosen are not strictly random – just the order is. I've tried this myself using RND but I get repetition. – **Philip Pugh, Hartlepool, Cleveland.**

● Curiously enough this problem was solved in the very first issue of *The Micro User* where it was used for a bingo game. It's quite simple: To ensure there's no repetition we need to keep track of the numbers, so we create an array of the appropriate size and make each element equal to its position in the array.

Then we mix them all up by selecting two elements at random and swapping them, then picking two others and swapping them, and so on. Then each can be taken in turn and they will be in a random order.

```
 10 REM Random
 20 max%=58
 30 Z%=RND(-TIME)
 40 DIM num%(max%)
 50 FOR N%=1 TO max%
 60   num%(N%)=N%
 70   NEXT
 80 REPEAT
 90 REM --- Mix 'em up
100   FOR N%=1 TO max%*4
110     A%=RND(max%)
120     B%=RND(max%)
130     Z%=num%(A%)
140     num%(A%)=num%(B%)
150     num%(B%)=Z%
160     NEXT
170 REM --- Print 'em
180   FOR N%=1 TO max%
190     PRINTN%,num%(N%)
200     NEXT
210   UNTIL GET<>32
220 END
```

Print problems

I OWN a BBC Master 128 with a Brother M1409 Printer and I use a BBC B, Master and Master Compact at school – all with Citizen 120D printers.

Because I have several programs which refuse to print out information correctly in any of these machine I took one of these programs to my Teacher's Centre to see if they could help. The programs worked perfectly well on all the machines which were connected to an Epson printer.

The problem seems to be that the computer issues a line-feed statement on carriage return and so does the printer. This can be cured if, on the 120D, the dip switch 2 is moved to the off position. However, it is then impossible to list a program as it prints it all on one line.

It isn't practical to change the dip switch each time I use the computers, so could you tell me how to alter the print command lines in the programs.

The current set of program lines in one of them appears to be:

```
10 VDU2
20 *FX5,1
40 *FX6,12
50 PRINT ....
60 VDU3
```

*It is possible to get the program to suppress line feeds by using *FX6,13 but then the form feed operates and paper shoots out in a steady stream all over the floor. Suppress that and it double spaces instead.*

As some commercially available word processors ask if the printer gives line feed it must be possible to make the programs work correctly on the correct Epson-compatible dip switch settings.

Though a simple problem, it is very infuriating. – **Margaret Wright, Stourbridge, West Midlands.**

● I'm afraid this seems to be an example of very poor programming – I can't really see why a program should send lots of clear screen (form feed) commands to the printer anyway. Unfortunately this makes it a far more complicated problem than it ought to be.

If you're into hacking you could find all the places, within the print routines, that use either CLS, PRINTCHR$12 or VDU12 and just remove them. Alternatively a program would have to be written that prevents the Return code or clear screen code from being sent to the printer – but only while printing is in progress.

Uncommunicative PCWs

I READ with interest the notes on data transfers on the problem page in the August issue of The Micro User. *I have recently changed schools and found that my new school has A3000s but that they use Amstrad PCWs for word processing.*

I need to modify a number of these files to update them for the changes in the National Curriculum and would love to port them to the A3000. Our computer department say that the hardware is no problem but they cannot help with the short routine to make the A3000 look like a parallel printer.

Would it be possible to supply the little routine necessary as it is certainly beyond my programming skills?

Also I am thinking of retiring my BBC Micro from active service and buying an Archimedes. I was going to get an A3000 but was advised to opt for an A410. My use will mainly be as a word processor and games, although I'll need to try out programs and possibly hardware for school.

As I have never been too clear about the difference between the two machines, would I be right in thinking that the A3000 is more for home use and the A410 for commercial applications? I would be glad for any advice. Also is it possible to get back issues of the Archimedes discs? – **Roger Wright, Sidcup, Kent.**

● The only practical way of transferring data from an Amstrad PCW to any other computer is through the serial port using communication software. The PCW does not have a parallel printer port as its integral printer is actually driven direct from the computer itself.

Unfortunately the PCW doesn't have a serial port either so you need to buy an add-on unit. If you're transferring to an A3000 you'll need the serial port chips fitted to that as well – the upgrade is fairly cheap. For communication software I'd recommend the PCW Mini Office II which is very easy to use. On the A3000 end there are a number of communication packages that will work.

The main difference between the A3000 and the A410 is in terms of hardware expandability – the A410 can take four internal expansion cards while the A3000 can take only one internally. Other than that they'll run the same software.

Back issues of the magazine and discs are available from Europress Direct, but they only cover the last six months.

Splitting the Electron

I AM running the Disc Partitioning program on an Acorn Electron Pegasus 400 DFS. Page is at &E00, as it is on a BBC Master. When the Part machine code is run it makes use of pages &E and &F to store a catalogue, wiping out anything which is stored there – Basic programs for instance. This can be very annoying. An easy solution is to alter the &E and &F in lines 510, 720, 730 and 1020 to other pages, &B and &C for example:

```
 510 LDA #&B:STA page:LDA #10:JSR &FFEE
 720 LDA #&C:STA cat_ptr+1:LDA #&78:STA name_ptr:LDY
 #4:JSR do_build
 730 LDA #&B:STA cat_ptr+1:LDA #&70:STA name_ptr:LDY
 #8:JSR do_build
1020 LDA #0:STA sec_num:LDA #&B:STA page:LDA #parts%:STA
 count
```

Running the program now wipes out the contents of pages &9 to &C, so you cannot use those pages for memory resident utilities or store function keys and so on. – **P. Wright, St Neots, Cambs.**

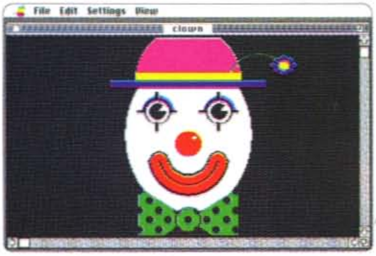
ALL programs printed in this magazine are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency.

Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh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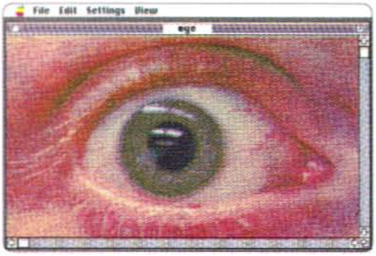
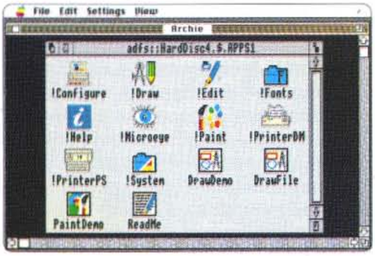
clown

BBC Micro, Master 128, or Master Compact
Convert to or from a BBC Screen Dump in any appropriate mode, including Teletext. You can dynamically adjust the colours assigned to each logical colour in the original dump, to take account of different palette settings.


File Edit Settings View
eye

Macintosh
Convert to or from PICT, Colour PICT, or MacPaint format. Images can be manipulated in drawing and painting programs, or placed in other Macintosh applications, such as PageMaker, for subsequent colour printing.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Acorn Archimedes
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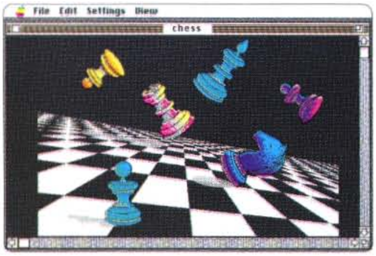
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THE MICRO USER

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February 1992
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For full details of CLICK or SP64i please 'phone or write, or alternatively send an addressed foolscap envelope with 50p stamp for the latest 30+ page catalogue of these and all other Slogger products for the Acorn Electron.

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The Morley Teletext Adaptor is an ideal companion for your BBC Micro system

Note: If you use your BBC Micro's auxlliary power socket for your disc drive, or any other external device, you will need a power supply which we can supply for an additional £9.95.

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Packed full of some of the best educational games available for the BBC Micro, the new Ten of the Best Educational Games is the ideal way for your children to learn about maths, spelling, anagrams, telling the time, general knowledge, and even the rudiments of running a business!

Specially compiled by the *Electron* and *Micro User*, teams to give a good grounding in all aspects of learning, and at the very special price of only £5.95 on tape, or £6.95 on disc, this collection is a treat you and your children cannot afford to miss!

Give your children hours of fun, and help them to learn the easy way by ordering your copy today

Tape £5.95
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For details of prices, please turn to the order form on page 138.

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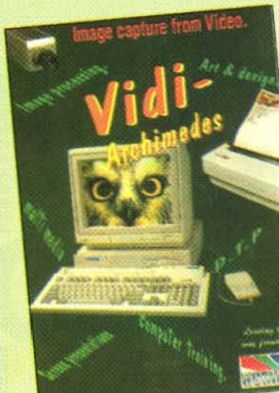

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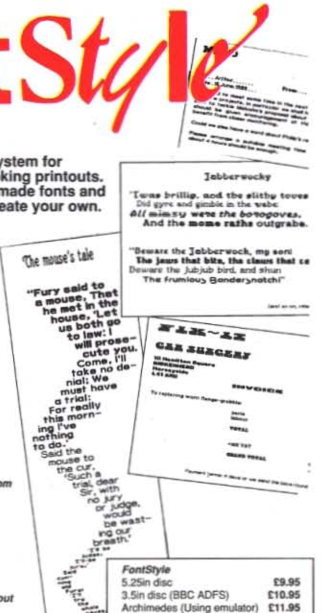

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

The mouse's tale

"Fury said to a mouse, That he met in the house, 'Let us both go to law: I will prosecute you. Come, I'll take no denial: We must have a trial: For really this morning I've nothing to do.' Said the mouse to the cur, 'Such a trial, dear Sir, with no jury or judge, would be wasting our breath.'

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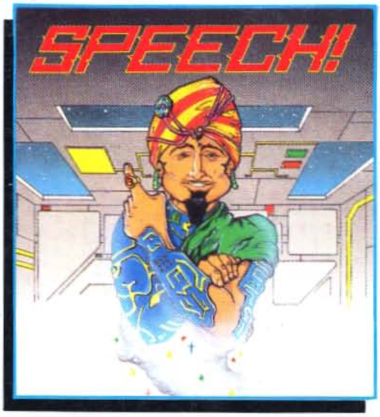

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SPEECH!
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SPEECH!

Give Your Computer a Voice

SPEECH! works entirely in software, no extra hardware whatsoever is required, and has an unlimited vocabulary. The program has a built-in parser which translates English words into phonemes, so it can directly speak words you input or text files. The phonemes can be used directly if you wish, so stress and intonation can be added as required and even foreign languages can be spoken. SPEECH! includes a user-friendly spelling program, which can be easily changed to include your own words.

The new A3000/Archimedes version of SPEECH! is fully RISC OS compatible and allows multitasking in Desktop. You can vary the pitch, speed, volume, and voice, both directly and in your own text files and programs, and can even 'sing' words over a four octave range! The A3000/Archimedes version also includes a program so you can alter the dictionary yourself.

BBC Micro/Master & A3000/Archimedes

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Snooker-Style Trivia Quiz Game for 1 to 4 Players

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Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

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BBC Micro/Master, Electron & A3000/Archimedes

OVER POCKET
Black Ball on Science & Nature
BBC Micro/Master

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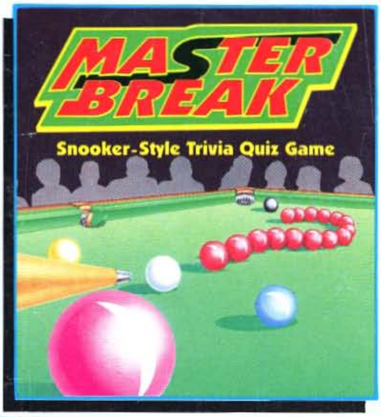

PLAY IT AGAIN SAM 15
NINJA
CYBORG WARRIORS
NETWORK
RICOCHET

Last Ninja 2

Cyborg Warriors

PLAY IT AGAIN SAM 15

A New Action-Packed Four-Game Compilation

LAST NINJA 2

The Last Ninja is back with a vengeance! Battling with fists, shuriken stars, swords and lots of other devious weapons, against the evil Shogun in downtown New York.

"Animation is excellent and there's lots of detailed scenery. The puzzles are quite fiendish" ....Micro User.

NETWORK

An action-packed 'Top Ten' game by Peter Scott, featuring teleport machines, lifts, springs, strange aliens and lots, lots more. Shoot your way through more than 100 different screens as you attempt to collect the twenty parts of the 'Flynche' machine. Nerve-tingling excitement.

BBC Micro/Master & Electron

CYBORG WARRIORS

A brand-new release by Superior. A multi-level, sideways scrolling shoot-em-up, with lots of weird robots and monsters to shoot, and tokens to collect which can give more powerful weapon systems. The BBC Micro/Master version has a joystick option, which allows two players to battle together.

RICOCHET

A massive arcade adventure with brilliant graphics, as you control SPRAT, the Small Partially Robotic Alien Time-traveller. Five different levels: FORTRESS, TECHLEV, DERELICT, THE UFO and ANCIENT.

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